CSC
L58C
1910

UNIVERSITY OF ILLINOIS LIBRARY
DEC 2 - 1910

UNIVERSITY OF ILLINOIS
JUN 19 1911
PRESIDENT'S OFFICE

APRIL, 1911

Lewis Institute Bulletin

ANNOUNCEMENT OF COURSES FOR 1911-1912

AND

DIRECTOR'S REPORT FOR 1910

Including Summary of Treasurer's Report

CHICAGO
Published by the Lewis Institute, Madison and Robey Streets
in January, April, July, and October

PUBLICATIONS OF THE LEWIS INSTITUTE

THE BULLETIN

COMPRISING THE FOLLOWING NUMBERS:

*REPORT of the Director and the Treasurer. Issued in January.

ANNOUNCEMENT of the Courses of Instruction to be offered during the Summer and the following school year. Issued in April.

ALUMNI NUMBER, containing matter of interest to former students. Issued in July.

REGISTER of Officers and Students for the preceding school year, with a revised Announcement of the Courses of Instruction for the following school year. Issued in October.

---

*Combined with April issue in 1911.

LEWIS INSTITUTE
BULLETIN

UNIVERSITY OF ILLINOIS
PRESIDENT'S OFFICE

ANNOUNCEMENT OF COURSES
FOR 1911-1912

AND

DIRECTOR'S REPORT FOR 1910

Including Summary of Treasurer's Report

CHICAGO, APRIL, 1911

TABLE OF CONTENTS

CALENDAR 4,
CORPORATION 6
OFFICERS OF ADMINISTRATION AND INSTRUCTION . . 7–10
GENERAL INFORMATION 11–20
  Scope of Work and Sessions 11
  Requirements for Admission to Day classes 12
  Assignment of Studies 13
  Definition of "Courses of Instruction" and "Units" . . 13
  The Degree of Bachelor of Science in Mechanical Engineering 13
  The Degree of Bachelor of Science and the Title of Associate in Domestic Economy 14
  The Title of Associate in Arts 14
    Suggested Academy Curriculum preparatory to Four-Year College Curriculum leading to degree of Bachelor of Science in Mechanical Engineering 15
    Four-Year College Curriculum leading to B.S. in Mechanical Engineering 15
    Suggested Academy Curriculum preparatory to Four-Year College Curriculum leading to Degree of Bachelor of Science in Domestic Economy 16
    Four-Year College Curriculum leading to Degree of Bachelor of Science in Domestic Economy . . . 16
    College Courses leading to Title of Associate in Arts . . 17
    The Academy Certificate 17
  The Co-operative Course for Shop Apprentices 17
  School Schedule for Shop Apprentices 18
  Half-Day, Evening, and Summer Courses 18
  Tuition and Fees 19
  Scholarships 20
  Standings and Reports 20
  Attendance and Discipline 20

DAY SESSION OF 1911-1912

  COURSES OF INSTRUCTION 21–44
    Mechanic Arts 21
    Engineering 23
    Mathematics 25
    Physics 27
    Chemistry 28
    Physiography and Geology 29
    Physiology and Bacteriology 30
    Domestic Economy 31
    History and Economics 32
    Philosophy 34
    English 34
    German 36
    French 37
    Latin 38
    Greek 39
    Decorative Art 40
    Physical Culture and Athletics 40

COURSES OF INSTRUCTION FOR SHOP APPRENTICES 40–44

EVENING SESSION OF 1911-1912
Officers of Administration and Instruction 45
General Information 47
Conspectus of Evening Courses of Instruction 48
Description of Evening Courses
Mechanic Arts 49
Engineering 50
Mathematics 51
Chemistry 52
Domestic Economy 53
English and History 53
Latin, German and Italian 53
Bookbinding 53

SUMMER SESSION OF 1911
Officers of Administration and Instruction 54
General Information 55
Courses of Instruction
Mechanic Arts 56
Mathematics 57
Physics and Engineering 58
Chemistry 58
Domestic Economy 58
History 58
English 59
Foreign Languages 59
Pottery 59

REPORT OF DIRECTOR FOR 1910 60
SUMMARY OF ATTENDANCE 1909-1910 63
SUMMARY OF TREASURER'S REPORT 64

CALENDAR

1911

JANUARY

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	..	..	..	..
..	..	..	..	..	..	..

FEBRUARY

..	..	..	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	..	..	..	..

MARCH

..	..	..	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	..

APRIL

..	..	..	..	..	..	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	..	..	..	..	..	..

MAY

..	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	..	..	..
..	..	..	..	..	..	..

JUNE

..	..	..	..	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	..

JULY

S	M	T	W	T	F	S
..	..	..	..	..	..	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31	..	..	..	..	..

AUGUST

..	..	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31	..	..

SEPTEMBER

..	..	..	..	..	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
..	..	..	..	..	..	..

OCTOBER

1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	..	..	..	..

NOVEMBER

..	..	..	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	..	..

DECEMBER

..	..	..	..	..	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31	..	..	..	..	..	..

1912

JANUARY

S	M	T	W	T	F	S
..	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	..	..	..

FEBRUARY

..	..	..	..	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	..	..

MARCH

..	..	..	..	..	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31	..	..	..	..	..	..

APRIL

..	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	..	..	..	..

MAY

..	..	..	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	..

JUNE

..	..	..	..	..	..	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	..	..	..	..	..	..

JULY

S	M	T	W	T	F	S
..	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	..	..	..
..	..	..	..	..	..	..

AUGUST

..	..	..	..	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

SEPTEMBER

1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	..	..	..	..	..
..	..	..	..	..	..	..

OCTOBER

..	..	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31	..	..

NOVEMBER

..	..	..	..	..	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	10	21	22	23
24	25	26	27	28	29	30
..	..	..	..	..	..	..

DECEMBER

1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	..	..	..	..
..	..	..	..	..	..	..

Institute Calendar—1911-1912

1911—

Jan. 2, Monday—Winter Quarter begins.

Feb. 22, Wednesday—Washington's Birthday—A Holiday.

March 24, Friday—Winter Quarter ends.

QUARTERLY RECESS FOR ONE WEEK

April 3, Monday—Spring Quarter begins.

May 18, Thursday—Evening Classes end.

May 30, Tuesday—Memorial Day—A Holiday.

June 17, 24, Saturdays, from 9 A. M. to 1 P. M.—Preliminary Examinations for Admission.

June 23, Friday—Spring Quarter ends.

July 3, Monday—Summer Session begins.

July 4, Tuesday—Independence Day—A Holiday.

Aug. 11, Friday—Summer Session ends.

Sept. 4-16, Monday to Saturday—Registration of incoming students.

Sept. 18, Monday—Autumn Quarter begins for students who have not heretofore been in attendance at the Institute. Recitations for one week as a basis for permanent classification.

Sept. 25, Monday—Autumn Quarter begins for students who were in regular attendance during the year 1910-1911.

Oct. 2-6, Monday to Friday, Evenings—Registration and Classification of candidates for Admission to Evening Classes.

Oct. 9, Monday—Evening Classes begin.

Nov. 30, Dec. 1, Thursday and Friday—Thanksgiving Recess.

Dec. 15, Friday—Autumn Quarter ends.

HOLIDAY RECESS FOR TWO WEEKS

1912—

Jan. 2, Tuesday—Winter Quarter begins.

Feb. 22, Thursday—Washington's Birthday—A Holiday.

March 22, Friday—Winter Quarter ends.

QUARTERLY RECESS FOR ONE WEEK

April 1, Monday—Spring Quarter begins.

May 16, Thursday—Evening Classes end.

May 30, Thursday—Memorial Day—A Holiday.

June 15, 22, Saturdays, from 9 A. M. to 1 P. M.—Preliminary Examinations for Admission.

June 21, Friday—Spring Quarter ends.

CORPORATION

OFFICERS

CHRISTIAN CECIL KOHLSAAT
President

THOMAS KANE
Vice-President

JOHN McLAREN
Secretary and Treasurer

TRUSTEES

Bernard Albert Eckhart
Oliver Harvey Horton
Thomas Kane
Christian Cecil Kohlsaat
John McLaren

BOARD OF MANAGERS

Bion Joseph Arnold
George Noble Carman
Bernard Albert Eckhart
James Bryan Herrick
Oliver Harvey Horton
Edmund Janes James
Harry Pratt Judson
Thomas Kane
Christian Cecil Kohlsaat
John McLaren
Addison Eldred Wells

George Noble Carman, *Director*
William Herbert Hall, *Business Manager*

Officers of Administration and Instruction

ADMINISTRATIVE OFFICERS

George Noble Carman, A. M.
Director

Edwin Herbert Lewis, Ph. D.
Dean of College Students

Philip Bell Woodworth, B. S., M. E.
Dean of Evening School

Alexander Willett Moseley, S. B.
Head of Department of Engineering

Helen Dougal Street, A. M.
Dean of Women Students

Philemon Bulkley Kohlsaat, Ph. B.
Registrar and Dean of Summer School

OFFICERS OF INSTRUCTION IN DAY SESSION

(The names in each group appear in the order of appointment to the group.)

Edwin Herbert Lewis, Ph. D.
Professor of English

Philip Bell Woodworth, B. S., M. E.
Professor of Physics

Clarence Elbert DePuy, B. S.
Professor of Machine Construction

Alexander Willett Moseley, S. B.
Professor of Mechanics

Warren Rufus Smith, Ph. D.
Professor of Chemistry

Herbert Edgar Cobb, A. M.
Professor of Mathematics

Fred A. Rogers, B. S.
Professor of Physics and Electrical Engineering

Jessie Louise Jones, Ph. D.
Professor of German

George Lee Tenney, A. M.
Professor of Latin

Charles Emerson Peet, B. S.
Professor of Physiography

John Derk Nies, B. S.
Professor of Electrical Engineering

Duane Studley, B. S.
Assistant Professor of Mathematics

Philemon Bulkley Kohlsaat, Ph. B.
Assistant Professor of English

*Berkeley John Thomas, A. M.
Assistant Professor of Mathematics

Helen Dougal Street, A. M.
Assistant Professor of Ancient History

Dic Hector Trowbridge, B. S.
Assistant Professor of Chemistry

Jesse Myron Owen, Ph. B.
Assistant Professor of English

Milo Milton Quaife, Ph. D.
Assistant Professor of History

William Parker Hawley, B. S.
Assistant Professor in charge of Mechanical Drawing

Justin Wyman Ludlow, M. E., C. E.,
Assistant Professor of Mechanics

Fred Lewis Turner, A. M.
Assistant Professor of Latin

Lea Rachel DeLagneau
Assistant Professor of French

Katherine Isabel Ingersoll
Assistant Professor in charge of Domestic Arts

Minna Caroline Denton, A. M.
Assistant Professor of Physiology and Bacteriology

Mabel Thacher Wellman, A. B.
Assistant Professor in charge of Domestic Science

Judson Fiske Lee, A. M.
Assistant Professor of History and Economics

Louis Edward Pope
Instructor in Mathematics

Marie Elsa Blanke
Instructor in Freehand Drawing

George Alexander Ross
Instructor in Woodwork

---

*Absent on leave

CHARLES EDGAR HOYT
Instructor in Foundry Work in charge of Shop Apprentices

JULIA DUMKE PEET, Ph. B.
Instructor in German

KATE BELLE MILLER, Ph. B.
Instructor in English

HORACE BERNARD McCABE
Instructor in Machine Shop Work

EDWARD LESTER WHEELER
Instructor in Physical Culture

ALPHONSO WIRTH CAVANAUGH
Instructor in Mathematics

ANNA ELIZABETH DRUMMOND, A. B.
Instructor in English

HELMUT BERENS, A. B.
Instructor in German

FREDERICK LESTER HAVENS, M. E.
Instructor in Forge and Machine Shop Work

GEORGE FREDERICK CASSELL, A. B.
Instructor in German and Greek

GRACE EMERSON MOORE
Instructor in Domestic Science

VICTOR LOUIS SHERMAN
Instructor in Mechanical Drawing

JULIA GRACE MERRILL
Instructor in Cooking

LOIS MARTIN
Instructor in Sewing and Textiles

GRACE LUCILE HENNECKE
Instructor in Millinery and Sewing

ROBERT FREDERICK BIESEMEIER
Instructor in Machine Shop Work

GRACE GORDON HOOD
Instructor in Cooking

FRANK HARRISON WADE, M. E.
Instructor in Physics

JUDSON THOMAS WEBB
Instructor in Pottery

EDWIN D. LEMAN
Instructor in Chemistry

JACOB M. KINNEY, A. M.
Instructor in Mathematics

HELEN F. PAGE
Instructor in English

JOHN HENRY SMALE, A. B.
Instructor in English

ADOLPH C. FENSHOLT
Instructor in Physics

FRANCES TALCOTT
Librarian

LAURA M. WINKLEMAN
Instructor in Millinery and Sewing

PORTIA CARNES, Ph. B.
Instructor in English and Dramatics

CHARLES J. CLARK
Instructor in Foundry

ADA ESTELLE CAMPBELL
Instructor in Latin and History

ETHEL J. POND
Instructor in Sewing

SARAH EDITH COLE
Instructor in Sewing

RHODA EDYE HARVEY
Assistant in Physical Culture

GEORGE R. MOORE
Assistant in Mathematics

CHARLES B. KAZDA
Assistant in Mathematics

CAROLINE WILKIE KOHLSAAT
Conductor of Orchestra

KATHARINE HOWARD WARD
Assistant in Music

ELIZABETH AGNES CADIGAN
Clerk and Telephone Attendant

General Information

Scope of Work

Lewis Institute is a polytechnic school for both sexes. The instruction offered may be grouped in three main divisions, viz.: Engineering and Mechanic Arts; Domestic Economy; the Liberal Arts. For four years of college work the Institute grants to men the degree of Bachelor of Science in Mechanical Engineering, and to women the degree of Bachelor of Science in Domestic Economy. The title of Associate is given for the work of two years of college grade, and the Academy Certificate for the work of four years of secondary grade.

The Sessions

The Day Session opens the third Monday in September and continues until the fourth Friday in June, and is divided into three quarters of twelve weeks each by a holiday recess of two weeks and a spring recess of one week. The Autumn Quarter is preceded by a preliminary week for students not before in attendance. The Day Session begins at 8:40 a. m. and lasts until 5 p. m. Hours are arranged as far as possible to suit the convenience of students.

For shop apprentices the session opens the last Monday in September and continues until the last Friday in August, so that each apprentice has 22 weeks in school, 26 weeks in shop and 4 weeks vacation.

The Evening Session opens the first Monday in October and continues until the third Thursday in May. The opening week is set apart for the registration and classification of candidates for admission. There are three terms of ten weeks each; one before, and two after, the holidays. The Evening Session begins at 4 p. m. and lasts until 10 p. m. Most of the classes meet from 7:30 to 9:30, for two evenings a week; Monday and Wednesday, or Tuesday and Thursday.

The Summer Session opens the first Monday in July and continues for six weeks. The hours are from 8 a. m. to 4 p. m., but most of the instruction is given in the forenoon.

Requirements for Admission to Day Classes

Applicants are admitted to the Institute as college students upon presentation of certificates of graduation from Chicago high schools or schools of equal rank, or upon satisfactory evidence by certificate of the completion of fifteen admission units, including as constants three units of English and two units of Mathematics, and are assigned to classes upon the basis of these certificates. Their standing, however, is regarded as probationary until confirmed by examination. The examinations are held during the first week of each school year, and take the form of recitations, oral and written, which determine the candidate's fitness to continue the work in the classes to which he has been assigned. The Institute reserves the right to revise such standing, if it should appear that the student needs more time for preparation in any given subject.

Applicants are admitted as academy students upon presentation of certificates of graduation from Chicago grammar schools or schools of equal rank.

Applicants for advanced standing, whether of college or of academy grade, are admitted upon presentation of certificates of work done from the schools in which they have received their previous training, and are assigned to classes upon the basis of these certificates, subject to the conditions mentioned above.

Other applicants whose maturity and experience seem to warrant the assumption that they are in a position to profit by connection with the Institute may be admitted probationally without entrance examination.

Applicants for admission other than those mentioned above will be examined on such subjects as are prerequisites for the studies which they wish to pursue.* In all cases the test will call for intelligence rather than for technical knowledge.

---

*For example, applicants for entrance into the first year of academy work will be examined on English, arithmetic, history of the United States, and geography, as taught in the Chicago grammar schools.

Assignment of Studies

On entering the Institute a student is assigned to such studies as seem to be best suited to his individual aims and needs, as far as these can be determined from personal consultation and from an examination of the records of work done elsewhere. This assignment is made for a term of three months and is revised each quarter in the light of the work of the preceding quarter.

Definition of "Courses of Instruction" and "Units"

Unless otherwise specified, a course of instruction continues for twelve weeks, with five fifty-minute periods of class work each week.

A unit consists regularly of three academy courses (a year's work) in any given subject.

Bachelor of Science in Mechanical Engineering

To be enrolled as a candidate for the degree of Bachelor of Science in Mechanical Engineering, a student must have done work which gives him credit for the fifteen admission units specified below, or he must have advanced collegiate standing equivalent to the admission units in which he is deficient. The fifteen units required are equivalent to the following academy courses, as defined on pages 21-40.

Courses	Units.
English, 1-9	3
Mathematics, 1-6, 10-12	3
German, A-F	2
Science, or additional foreign language	2
History, 4-6	1
Physics, 1-3	1
Drawing, Mechanic Arts, 1, 5, 6	1
Shopwork, Mechanic Arts, 2, 3, 4, 7, 19, 20	2

High school graduates who are unable to meet these requirements for enrollment as candidates for the degree are given an opportunity of pursuing such engineering courses as their preparation makes possible. They may at the same time make up deficiencies in requirements in the academy courses of the Institute. Special opportunities for meeting the requirements in mathematics, shopwork, and drawing are furnished by means of the Summer School and by means of Saturday morning classes during the school year.

Four years of college work are required for the Degree of Bachelor of Science in Mechanical Engineering. The requirements are shown in detail in the curriculum (see next page).

The Degree of Bachelor of Science and the Title of Associate in Domestic Economy

To be enrolled as a candidate for the degree of Bachelor of Science or for the title of Associate in Domestic Economy, a student must have credit for fifteen admission units, three of which shall be in English and two in Mathematics, or she must have collegiate standing equivalent to the admission units in which she is deficient.

Two years of college work are required for the title of Associate, and four years for the degree of Bachelor of Science. The requirements are shown on page 16 in the college curriculum. The work of the second year may be so modified by candidates for the title as to put the emphasis on either cooking or sewing. The additional requirements for the degree are an extra year in domestic economy, in which the student may specialize in either domestic science or domestic art, and also a year of college electives in the liberal arts.

On page 16 is a suggested academy curriculum preparatory to the college curriculum in domestic economy. Modifications of this curriculum are permissible, but in order to enable a student to complete in two years the courses prescribed for the title of Associate there should be one admission unit in either physics, chemistry, or cooking, and also a unit in sewing or an equivalent practical knowledge. Opportunities for meeting the requirements in these subjects are furnished by means of the Summer School and by Saturday morning classes during the school year.

The Title of Associate in Arts

To obtain the Title of Associate in Arts the student must secure, in addition to the fifteen admission units, credit for eighteen college courses, representing two years of work. Of these courses two must be in English Composition.

SUGGESTED ACADEMY CURRICULUM PREPARATORY TO FOUR-YEAR COLLEGE CURRICULUM LEADING TO DEGREE OF B. S. IN MECHANICAL ENGINEERING*

FIRST YEAR

AUTUMN QUARTER	Course	Hours	WINTER QUARTER	Course	Hours	SPRING QUARTER	Course	Hours
English	1	5	**English**	2	5	**English**	3	5
Algebra A W	1	5	**Algebra** W S	2	5	**Algebra** A S	3	5
Machine Sketching E	1	10	**Wood Shop** E	2	10	**Instrum'l Drawing** E	5	10
Physiography	1	10	Physiography	2	10	Physiography	3	10

SECOND YEAR

AUTUMN QUARTER	Course	Hours	WINTER QUARTER	Course	Hours	SPRING QUARTER	Course	Hours
English	4	5	**English**	5	5	**English**	6	5
Plane Geometry A W	4	5	**Plane Geometry** W S	5	5	**Plane Geometry** A S	6	5
Projection Draw'g E	6	10	**Forge Shop** E	3	10	**Foundry** E	4	10
German	A	5	**German**	B	5	**German**	C	5

THIRD YEAR

AUTUMN QUARTER	Course	Hours	WINTER QUARTER	Course	Hours	SPRING QUARTER	Course	Hours
American History	4	5	**American History**	5	5	**American History**	6	5
Physics	1	10	**Physics**	2	10	**Physics**	3	10
Machine Shop E	19	10	**Machine Shop** E	20	10	**Pattern Shop** E	7	10
German	D	5	**German**	E	5	**German**	F	5

FOURTH YEAR

AUTUMN QUARTER	Course	Hours	WINTER QUARTER	Course	Hours	SPRING QUARTER	Course	Hours
English A W	7	5	**English** E	8	5	**English**	9	5
Algebra A W	10	5	**Algebra** W S	11	5	**Solid Geometry**	12	5
Pattern Shop	8	10	Machine Shop E	22	10	Machine Shop E	22	10
German	G	5	German	H	5	German	I	5

FOUR-YEAR COLLEGE CURRICULUM LEADING TO DEGREE OF B. S. IN MECHANICAL ENGINEERING

FIRST YEAR

AUTUMN QUARTER	Course	Hours	WINTER QUARTER	Course	Hours	SPRING QUARTER	Course	Hours
English	A	5	**English**	B	5	**English**	C	5
Algebra A W	13	5	**Trigonometry** W S	14	5	**Analyt'l Geometry**	15	5
Chemistry	1	14	**Chemistry**	2	14	**Chemistry**	3	14
Machine Draw'g E	10	10	**Machine Sketching**	11	10	**Surveying**	13	10

SECOND YEAR.

AUTUMN QUARTER	Course	Hours	WINTER QUARTER	Course	Hours	SPRING QUARTER	Course	Hours
Economics	10	5	**Economics**	11	5	**Economics**	12	7
Calculus	16	5	**Calculus**	17	5	**Calculus**	18	5
Physics	4	15	**Physics**	5	15	**Physics**	6	15
Kinematics	28	5	**Descr'ptive Geomet'y**	25	7	**Machines**	15	8

THIRD YEAR.

AUTUMN QUARTER	Course	Hours	WINTER QUARTER	Course	Hours	SPRING QUARTER	Course	Hours
Mechanics	16	5	**Mechanics**	17	5	**Mechanics**	18	7
Thermodynamics	43	5	**Machine Shop**	23	10	**Valve Gears**	31	10
Electrical Laborat'y	35	10	**Electrical Laborat'y**	36	10	**Electrical Laborat'y**	37	10
Machine Draw'g A S	12	10	**Foundry**	9	5	**Mach. Tool Anal.**	24	10

FOURTH YEAR.

AUTUMN QUARTER	Course	Hours	WINTER QUARTER	Course	Hours	SPRING QUARTER	Course	Hours
Hydraulics	42	5	**Direct Current Mach.**	38	5	**Induction, Motors, etc**	39	5
Chemistry	4	10	**Chemistry**	6	10	**Chemistry**	12	10
Machine Design	32	10	**Struct'l Steel Work**	33	10	**Power Plants**	49	15
Materials of Const.	46	5	**Specifications**	50	2			

* When a Course is given in more than one quarter, the quarter is indicated as follows: E=every quarter, A=Autumn, W=Winter, S=Spring,

SUGGESTED ACADEMY CURRICULUM PREPARATORY TO FOUR-YEAR COLLEGE CURRICULUM LEADING TO DEGREE OF B. S. IN DOMESTIC ECONOMY

FIRST YEAR

AUTUMN QUARTER	Course	Hours	WINTER QUARTER.	Course	Hours	SPRING QUARTER.	Course	Hours
English	1	5	English	2	5	English	3	5
Algebra ... A W	1	5	Algebra ... W S	2	5	Algebra ... A S	3	5
Latin 1 or German	A	5	Latin 2 or German	B	5	Latin 3 or German	C	5
Drawing	1	10	Drawing	2	10	Drawing	3	10

SECOND YEAR

English	4	5	English	5	5	English	6	5
Accounting	7	5	Accounting	8	5	Accounting	9	5
Latin 4 or German	D	5	Latin 5 or German	E	5	Latin 6 or German	F	5
Sewing	A	10	Sewing	B	10	Sewing	C	10

THIRD YEAR

Plane Geometry AW	4	5	Plane Geometry WS	5	5	Plane Geometry,.A S	6	5
Ancient History	1	5	Ancient History	2	5	Ancient History	3	5
Latin 7 or German	G	5	Latin 8 or German	H	5	Latin 9 or German	I	5
Hygiene ... E	3	5	Cooking ... AW	1	10	Cooking ... WS	2	10

FOURTH YEAR

English	7	5	English	8	5	English	9	5
American History	4	5	American History	5	5	American History	6	5
Latin 10 or French	1	5	Latin 11 or French	2	5	Latin 12 or French	3	5
Physics	1	10	Physics	2	10	Physics	3	10

FOUR-YEAR COLLEGE CURRICULUM LEADING TO DEGREE OF B. S. IN DOMESTIC ECONOMY

FIRST YEAR

Chemistry	1	10	Chemistry	2	10	Chemistry	3	10
Cooking ... A W	4	10	Cooking ... W S	5	10	Plant Physiology	1	8
Sewing and Design	D	10	Sewing and Design	E	10	Sewing and Design	F	10
English	10	2	English	10	2	English	10	2

SECOND YEAR

Physiology ... A W	2	10	Bacteriology ... A W	3	10	Sanitation	10	5
Food and Dietetics	7	10	Food and Dietetics	8	10	Cooking	6	10
Millinery and Sewing	G	10	Sewing and Laundry	H	10	Sewing and Textiles.	I	10
The Household	9	2	The Household	9	1	The Household	9	2

THIRD YEAR

Dressmaking	J	10	Textiles	K	5	Textiles	L	10
Cooking	11	10	Cooking	12	10	Applied Design,	M	10
English	13	5	Home Management	13	5	Teaching Dom. Sc	14	5
Economics	10	5	Economics	11	5	Economics	12	5

FOURTH YEAR

Special Problems	15		Special Problems	15		Special Problems	15	
Electives			Electives			Electives		

COLLEGE COURSES LEADING TO TITLE OF ASSOCIATE IN ARTS

FIRST YEAR

AUTUMN QUARTER	Course	Hours	WINTER QUARTER	Course	Hours	SPRING QUARTER	Course	Hours
English	10	5	English	11	5	English	12	5
European History	7	5	European History	8	5	European History	9	5
Mathematics	13	5	Mathematics	14	5	Mathematics	15	5
Chemistry	1	10	Chemistry	2	10	Chemistry	3	10
Latin	13	5	Latin	14	5	Latin	15	5
German	1	5	German	2	5	German	3	5
French	1	5	French	2	5	French	3	5
Greek	1	5	Greek	2	5	Greek	3	5

SECOND YEAR

English	13	5	English	14	5	Philosophy	1	5
History	13	5	History	14	5	History	15	5
Economics	10	5	Economics	11	5	Economics	12	5
Mathematics	16	5	Mathematics	17	5	Mathematics	18	5
Physics	4	15	Physics	5	15	Physics	6	15
Chemistry	4	10	Chemistry	6	10	Chemistry ....A S	5	10
Latin	16	5	Latin	17	5	Latin	18	5
German	4	5	German	5	5	German	6	5
French	4	5	French	5	5	French	6	5
Greek	4	5	Greek	5	5	Greek	6	5

The Academy Certificate

To obtain the Academy Certificate the student must complete 15 units, of which 7 are prescribed as follows: English 3, algebra and geometry 2, foreign language or mechanic arts or domestic economy 2. The remaining 8 units are not elected by students, but are arranged for and planned with them with the view of helping them to make the best use of their time and talents and opportunities.

The Co-operative Course for Shop Apprentices

In January, 1909, a plan of co-operation in the training of shop apprentices was inaugurated by the Institute and certain manufacturers in Chicago. The Apprentices are sent to the Institute half the time, alternating one week in the shop and the next week in school.

It is not the idea of either the manufacturers or the Institute that a boy can become a skilled workman in two years, but that work in the shop combined with instruction in the school gives him a more intelligent idea of his trade than he can otherwise obtain.

Boys between sixteen and twenty-one years of age are eligible to admission. No formal examination is required of applicants, but the candidate must satisfy the employer that he is capable of doing the work required in the shop and must satisfy the Institute that he is prepared to profit by the instruction that will be given.

SCHOOL SCHEDULE FOR SHOP APPRENTICES

FIRST YEAR

Hours	Autumn Quarter	Winter Quarter	Spring Quarter
8:40 to 10:30	Engn'ring Principles.	Engn'ring Principles.	Engn'ring Principles.
10:40 to 11:30	Shop Mathematics....	Shop Mathematics....	Shop Mathematics....
11:40 to 12:30	English..............	English..............	English..............
1:10 to 3:00	Machine Sketching...	Machine Sketching...	Machine Sketching...
3:10 to 5:00	Machine Shop.........	Machine Shop.........	Foundry...............

SUMMER	8:10 to 10:00	Engineering Principles.
	10:10 to 11:00	Applied Mathematics.
	11:10 to 12:00	Chem. Demonstration Lectures
	1:10 to 4:00	Engineering Principles.

SECOND YEAR

Hours	Autumn Quarter	Winter Quarter	Spring Quarter
8:40 to 10:30	Steam Laboratory....	Mechanics............	Shop Organization....
10:40 to 11:30	Applied Mathematics	Applied Mathematics	Applied Mathematics
11:40 to 12:30	English..............	English..............	English..............
1:10 to 3:00	Mechanical Drawing.	Machine Drawing.....	Gearing and Cams....
3:10 to 5:00	Pattern Shop..........	Forge Shop............	Machine Shop.........

Half-Day, Evening, and Summer Courses

As a rule students in the day classes are expected to make their work systematic by aiming definitely toward the degree, the title, or the certificate. It is recognized, however, that many students are obliged to leave school in order to take care of themselves and those dependent upon them, at a time when their more fortunate associates enter upon such courses of instruction as are herein outlined. To such students the Institute offers opportunities for special instruction in accordance with their needs, particularly in the line of shopwork, mechanical drawing, and domestic economy. Such as can attend the Institute but half of each day may, by prolonging the time requirement, complete the work of some one group of studies, or at least make advancement in one or more subjects.

Provision has also been made for such evening instruction as will enable young men and women who are employed during the day to continue their education along those lines which will be of the most service to them in the work in which they are engaged. In point of number of students and benefits derived by them no work of the Institute is more important.

The summer courses are designed for students who wish to shorten the time necessary for completing the work required for graduation, to make up deficiencies in scholarship, or to pursue special courses in the shops or laboratories. Any course of instruction offered by the Institute will be repeated during the summer, if the demand is such as to justify the formation of a class.

Tuition and Fees

Day students are required to pay a registration fee of five dollars. This fee is due at the time of registration. The rate of tuition for day students is twenty dollars a quarter. Where a student limits himself to one course of instruction, with five hours of class work each week, there is a reduction of ten dollars a quarter. In laboratory, drawing, and shopwork, ten hours, or a fraction thereof, count as five in determining the charge.

The rate for evening students is five dollars for a term of ten weeks for one course of instruction, two evenings a week, and ten dollars for two courses, four evenings a week.

The tuition for the summer term for each course of five hours a week of class instruction is five dollars. Students who attend only in the summer are not required to pay the registration fee.

Both day and evening students who take one or more shop or laboratory courses in the departments of physics, chemistry, mechanic arts, engineering, and cookery are required to pay a shop or laboratory fee of five dollars a quarter or term.

Students in chemistry deposit five dollars to cover breakage. If the charges do not amount to five dollars, the excess is returned to the student.

All payments are due in advance, on the first day of the quarter. Checks and money orders should be made payable to Lewis Institute.

Scholarships

Three scholarships, each amounting to one year's tuition, have been established under the will of the late Mrs. Hugh A. White.

One scholarship amounting to one year's tuition has been established by Mr. Bernard A. Eckhart.

The tuition of the boys in the Co-operative Course for Shop Apprentices who do satisfactory work in both the shop and the school is paid by Mr. La Verne W. Noyes.

Standings and Reports

At the end of the quarter reports are sent to parents or guardians, showing the standings of students in the courses of instruction pursued. These standings are based on daily work and quarterly examinations. The parents of students who are not doing satisfactory work are notified in the middle of the quarter, and their co-operation is secured, when possible, through personal interviews.

Attendance and Discipline

Prompt and regular attendance and earnest effort are expected of every student. When such attendance and such effort cannot be secured, and when it becomes apparent that the student is not profiting by his connection with the Institute, his parents or guardians will be given an opportunity of withdrawing him; if he is not withdrawn within a reasonable time, he will be dismissed.

Courses of Instruction

NOTE.—The Courses of Instruction offered are tabulated on pages 15-17 and the quarter in which each course is given is indicated. Under the heading "Hours" is given the number of hours of required attendance in class. The courses are classed as follows:

ACADEMY COURSES: Mechanic Arts, 1-7, 19, 20, 22; Mathematics, 1-12; Physics, 1-3; Physiography, 1-3; Domestic Economy, A-C, 1-3; History, 1-6; English, 1-9; German, A-I; Latin, 1-12; Free Hand Drawing, 1-3.

COLLEGE COURSES: Mechanic Arts, 8-11, 21, 23; Engineering, 12-50; Mathematics, 13-18; Physics, 4-6; Chemistry, 1-12; Geology, 4; Physiology and Bacteriology, 1, 2, 3; Philosophy, 1; Domestic Economy, D-M, 4-15; History and Economics, 7-15; English, 10-15, A-C; German, 1-9; French, 1-9; Latin, 13-18; Greek, 1-6.

Mechanic Arts

All subjects in shop practice, machine construction, machine sketching, and mechanical drawing are included in this division.

The courses in mechanic arts are designed primarily for students who plan to follow mechanical and electrical engineering. A systematic education in drawing and shopwork, however, constitutes a good preparation for many trades, for other branches of engineering, for architecture, and for any of the mechanical industries.

1. MACHINE SKETCHING. Constructive work in perspective. Dimensioned sketches of machine parts.

2. WOOD WORK. A fundamental course in bench work and wood turning preparatory to pattern work and to the arts and crafts. Special emphasis is given to the care and use of tools and to the study of different woods and their characteristics.

2a. WOOD WORK. For students who do not intend to follow engineering lines. Methods acquired in Course 2 applied to the construction of simple pieces of furniture. Original designs. Talks on construction and finish.

2b. WOOD WORK. A Continuation of Course 2a. Study of designs from different manufacturers. Practice in the mixing of stains, varnishes, and finishes. Practice with woodworking machinery.

3. FORGE WORK. Simple forging. Hardening and tempering. Work with steam hammer.

4. FOUNDRY WORK. Study of modern foundry construction, equipment, materials and methods. Practice in molding, coremaking, melting, and pouring.

5. Instrumental Drawing. The first work with drawing instruments. Lettering and conventional representation of threads, bolts and nuts, and fastenings. Construction of mathematical curves. Designed to establish standard methods.

6. Projection Drawing. Planes of projection; intersections, including conic sections; revolution of views and development of surfaces. Making of detail and assembly drawings of simple machines and parts; tracing.

7. Pattern Making. Practice in making simple patterns. Use of general woodworking machines. Stress is laid upon the relation of pattern work to the work of foundry and machine shop.

8. Pattern Making. A continuation of Course 7.

9. Advanced Foundry Work. Problems introduced by heavy castings, production, and molding machines; foundry equipment and arrangement; correlation of work of foundry with that of pattern shop, machine shop, and drafting room.

10. Machine Drawing. Making of detail drawings and assembly drawings of machines; tracing.

10a. Machine Drawing. A continuation of Course 10. Mechanical drawing and tracing.

11. Advanced Machine Sketching. Making of perspective sketches from mechanical drawings and empirical formulas. Intended to develop the student's sense of proportion and to acquaint him with the mechanism and details of certain machines.

19. Bench Metal Work. Description of the materials commonly used in machine work and the tools employed in bench and floor work; practice in chipping, filing, laying-out, and other processes.

20. Machine Tool Work. Description of the construction and operation of the engine lathe, shaper, and universal miller; essentials of metal cutting tools; practice with these machines in fundamental operations.

21. Forge Work. Jig, steam hammer, and special work. Shop methods, cost estimating, forge shop equipment.

22. Machine Tool Work. (One or more quarters.) Practice with machine tools, hand tools, standard gauges, and measuring instruments in making, finishing, and assembling machines and machine parts, taps, dies, reamers, milling cutters, punching and drawing dies.

23. Gear and Cam Construction. Practice with machine tools and instruments in the application of the principles of mechanism to the construction of spur, bevel, and spiral gears, racks, and cams. Prerequisite: *Engineering* 12 *and* 28.

Engineering

The courses grouped in this division are open to college students and include applied mathematics, applied electricity, testing of machinery and materials, and machine design. These courses, in conjunction with the college mathematics, chemistry, physics, mechanic arts, English, history, and economics, lead up to the degree of Bachelor of Science in Mechanical Engineering. The studies are so arranged, however, that those students in engineering who do not expect to receive the degree may derive much benefit by closely following the regular arrangement of studies during the time that they are able to remain at the Institute.

12. ADVANCED MACHINE DRAWING. Gearing; involute and cycloidal. Bevel and screw gears. Problems in various types of cams. Problem in arrangement of piping. Tracing. Prerequisite: *Engineering* 28.

13. SURVEYING. Measurement of distances by pacing, chain, and tape. Practice in the use of compass, transit, and level in land and city surveying, leveling, and the running of simple railway curves. Study of the construction, testing, and adjustment of instruments. Field records and office copies. Prerequisite: *Mechanic Arts* 1 *and* 6; *Mathematics* 14.

15. MACHINES. Principles of the steam engine, steam boiler, pump, and other machines and appliances. The work is elementary in character and is intended to acquaint the student with the details and use of the machines studied, both as a preparation for the courses in valve gears and thermodynamics and as a practical training for the shop and power plant. Prerequisite: *Course* 28.

16. MECHANICS, STATICS. Composition and equilibrium of concurrent and non-concurrent forces; suspended weight and catenary. Prerequisite: *Physics* 4; *Mathematics* 15 *and* 18.

17. MECHANICS, KINETICS. Rectilinear motion; virtual velocities; moment of inertia; dynamics of a rigid body; work, energy, and power; friction. Prerequisite: *Course* 16.

18. MECHANICS, STRENGTH OF MATERIALS. Elementary stresses and strains; flexure of beams; continuous girders; flexure of long columns; combined stresses. Prerequisite: *Course* 17.

24. MACHINE TOOL ANALYSIS. The study of existing machines and tools to determine the principles involved in their construction; examining and testing of machines and mechanisms for rigidity, accuracy, or efficiency. Prerequisite: *Course* 12; ***Mechanic Arts* 23.**

25. DESCRIPTIVE GEOMETRY AND KINEMATIC DRAWING. Graphical methods for the solution of problems in the intersections of lines and surfaces. Problems in Kinematics. Practical applications. Prerequisite: *Mechanic Arts* 11; *Mathematics* 15.

27. MACHINE DESIGN. Stresses in machine parts, especially under the conditions of motion. Prerequisite: *Course* 32.

28. KINEMATICS. A study of the laws of the communication of motion by mechanisms. Rolling and sliding contact, linkwork, belts and bands, aggregate combinations. Prerequisite: *Mechanic Arts* 11; *Mathematics* 15.

31. VALVE GEARS. The application of the principles of the courses in Machines (15), Kinematics (28), and Thermodynamics (43), to the study of various types of valves and valve gears. Prerequisite: *Courses* 28 *and* 43.

32. MACHINE DESIGN. The elements of steam-engine design. Study of the different types of boilers. Boiler design. Prerequisite: *Courses* 18 *and* 31.

33. STRUCTURAL STEEL WORK. The study of the stresses and details of the plate girder, roof truss, and simple pin-connected bridge. Current specifications. Shop visits. Prerequisite: *Course* 46.

35. DIRECT CURRENT PRINCIPLES AND PRACTICE. Magnetic and electric calculations for generators and motors; armature windings; characteristic curves; wiring; instruments. Prerequisite: *Physics* 6; *Mathematics* 18.

36. ALTERNATING CURRENT PRINCIPLES. Sine functions; vectors; reactance; condensance; impedance; series parallel circuits; transmission lines. Prerequisite: *Course* 35.

37. ALTERNATING CURRENT MACHINERY. Transformer; generator; induction motor; synchronous motor; rotary converter. Prerequisite: *Course* 36.

38. DIRECT CURRENT MACHINERY. Motor control systems. Armature reaction. Distortion of field flux. Harmonic analysis. Rotary converter wave form. Prerequisite: *Course* 37.

39. INDUCTION MOTOR, FLUX DISTRIBUTION, etc. SYNCHRONOUS APPARATUS. Prerequisite: *Course* 38.

42. HYDRAULICS. The mechanics of fluids at rest and in motion; flow of water through weirs, orifices, and pipes; pumps and motors; study of design of turbine. A brief consideration of water supply and drainage. Class room and laboratory. Prerequisite: *Course* 17.

43. THERMODYNAMICS. The laws of thermodynamics and their application to engines, boilers, refrigerating machines, injectors, and other apparatus. Prerequisite: *Course* 15; *Mathematics* 18.

44. HEAT ENGINES. A short course in the steam and gas engine laboratories. Prerequisite: *Course* 43.

46. MATERIALS OF CONSTRUCTION. The study of the properties of materials commonly used in construction. Preparation of test specimens. Practice with testing-machinery. Prerequisite: *Course* 18.

49. POWER PLANTS. Study of arrangement of engines, boilers, and accessories. Tests. Prerequisite: *Courses* 43 *and* 44.

50. SPECIFICATIONS AND CONTRACTS. A brief course upon the broad principles which form the basis of all specifications and contracts. The study of certain typical specifications in some detail.

Mathematics

The aim of the instruction in mathematics is to meet the needs of students who are to use mathematics as a tool. It is believed that this can be done without sacrificing the necessary training in logical thinking and the careful study and discussion of fundamental principles. The interrelation of the various branches of mathematics is recognized, and an attempt is made to maintain the continuity of the science. Algebra, geometry, trigonometry, analytic geometry, and calculus are not studied as unrelated disciplines, but students are taught to draw from their knowledge of all these branches when solving problems. Squared paper is used in all the courses to solve problems as well as to illustrate abstract principles.

1. Elementary Algebra. Addition and subtraction, parentheses, multiplication and division, positive and negative numbers, problems and equations; graphic representation of statistics.

2. Elementary Algebra, four days a week. Simple simultaneous equations; problems involving one, two, or three variables; application of graphs to simultaneous equations and to the solution of practical problems; factoring. Concrete Geometry, one day a week.

3. Elementary Algebra, four days a week. Involution and evolution, radicals, quadratic equations, simultaneous equations involving quadratics, highest common factor, lowest common multiple, ratio and proportion, equations involving fractions, graphs. Concrete Geometry, one day a week.

4. Plane Geometry. Preliminary definitions, triangles, parallels, parallelograms, problems, loci of points, geometrical exercises for algebraic solution.

5. Plane Geometry. Circles, ratio and proportion, similar triangles, exercises for algebraic solution.

6. Plane Geometry. Areas of polygons, regular polygons, measurement of the circle, problems involving the use of algebraic equations and functions of angles. A four place table of logarithms is used in the numerical computations.

7. Accounting. Common and decimal fractions, addition, percentage, discounts, commission, insurance, exchange bills, settlements, averaging accounts, profit and loss. Special work in mental calculations.

8. Accounting. Introduction and use of main books used in accounting, and application of principles learned in Course 7 to business transactions recorded in them. Exercises in opening and closing books, and practice in writing business papers.

9. Accounting. Continued use of main books and introduction of four auxiliary books: cash, sales, invoice, and bill books. A short study of partnerships, the adjusting of profits and losses, and making

settlements. Attention given to principles governing the recording of business transactions, rather than to particular methods that are limited in their application. It is hoped that the student who has taken this course will be able to devise a system answering the requirements of an ordinary business.

10. ADVANCED ALGEBRA. Factors; fractions; evaluation of surds; solution of equations, including graphical methods; powers and roots; quadratics, by factoring and completing the square; ratio and proportion; use of formulas; combined methods of arithmetic, algebra, and geometry in the solution of problems based upon the work in the shops and laboratories; measurements; approximate numbers; short methods to meet the limitations of per cent error; checking of results.

11. ADVANCED ALGEBRA. Graphical solutions; imaginary quantities; extension of number field; interpretation of infinite and indeterminate results; simultaneous quadratics, with use of quadratic formula; equivalent systems of equations; theory of quadratics; value-range in quadratic expressions; functionality; progressions; permutations; theory of indices; logarithms and their applications, four place tables; the slide rule; angle functions; simple trigonometric relations involving special angles; graphing of observed data and determination of the equation law; checking of results.

12. SOLID GEOMETRY. Points, lines, and planes in space; mensuration of polyhedron, cylinder, cone and sphere; abundant numerical applications; measurements and computation; theory and use of approximate numbers; checking results.

13. ALGEBRA. Permutations and combinations, limits, convergency of series, undetermined coefficients, summation of series, logarithms, determinants, theory of equations with much attention to the methods of solving numerical equations.

14. PLANE TRIGONOMETRY. Functions of angles, trigonometric equations and identities, solution of triangles, applications.

15. ANALYTIC GEOMETRY. The equations and properties of the point, straight line, circle, parabola, ellipse, and hyperbola; co-ordinates in space; surfaces, curves, and equations; the use of graphic methods in solving practical problems.

16. CALCULUS. Differentiation, applications of the derivative, rates, problems involving maxima and minima, points of inflection, simple integrations, radius of curvature, indeterminate forms.

17. CALCULUS. Partial differentiation, expansion of functions, curve tracing, integration, the definite integral, applications.

18. CALCULUS. Double and triple integration, differential equations. Applications of calculus to the integrations most frequently required in engineering subjects; intended to familiarize the student with the use of calculus as a practical instrument in mechanics, thermodynamics, and electricity.

Physics

The work of the department consists of courses in general physics, together with special courses for students in engineering.

The design of the courses in general physics is to familiarize students with the principles of physics, to cultivate correct methods of laboratory work, and to serve as an introduction to applied mathematics. Attention is given to the preparation of records, to the manipulation of apparatus, and to the cultivation of the patience necessary to secure the best results.

Courses 4 to 6 are for college students only, and may not be taken until the student has had such work in mathematics as will enable him to solve the problems that arise in lecture discussion and detailed laboratory practice. These courses are designed for students who intend to specialize in physical science or in engineering.

1. GENERAL PHYSICS. Mechanics: A discussion and illustration of physical quantities and their measurement; simple types of motion; density; velocity, acceleration, force, work, power and efficiency, elasticity, and surface tension. Heat: Thermometer, expansion, calorimetry, change of state, solutions, transference of heat, and theory of gases. LABORATORY PHYSICS. Strictly quantitative, covering subjects named above.

2. GENERAL PHYSICS. Electricity: Electrification, the electric field, electrostatic instruments, electric discharges, magnetism; the electric current, the electromagnetic field, relations between heat and electricity, units, telegraph and telephone, and electric waves. LABORATORY PHYSICS. Quantitative measurements of current; electromotive force and resistance; testing batteries, incandescent lamps, arc lamps, motors and generators.

3. GENERAL PHYSICS. Sound: Waves, sounds and their relations, sonorous bodies, compound tones, and musical instruments. Light: Nature and propagation, reflection, refraction, theory of optical instruments, interference, dispersion, radiation and absorption of light waves; color; polarization. LABORATORY PHYSICS. Quantitative work in mechanics, heat, sound, electricity, and light, and calibration of instruments.

4. MECHANICS. Standard units; dimension of dynamical units; properties of matter; measurements of precision in length, mass, and time; kinematics; statics; dynamics; special problems. Prerequisite: *Mathematics* 14.

5. ELECTRICAL MEASUREMENTS. Magnetism; magnetic units; measurement of earth's field; electrostatics, electromagnetism; electromagnetic units; electrodynamics; measurement of resistance, current, electromotive force, quantity, capacity and temperature coefficients, calibration of instruments; electromagnetic theory of light. Prerequisite: *Mathematics* 14.

6. Heat and Light. Calorimetry; radiation, conduction; thermodynamics; kinetic theory of gases; kinds of vibration; media of propagation; measurement of light waves; interference, reflection, and refraction of waves; photometry; special problems for advanced students. Prerequisite: *Mathematics* 14.

Chemistry

The aim of the courses in chemistry is to give in the first place a knowledge of the fundamental principles of the science as a part of a general education; and afterwards a more extended knowledge of the subject and practice in manipulation to those who wish to devote themselves to pure or applied chemistry, or whose work along other lines will be made more efficient by a thorough training in chemistry. Engineering students are encouraged to become familiar with the principles on which manufacturing processes or industrial methods are based, so that a firm foundation may be laid for subsequent specialization in these directions. Opportunities are given for excursions to the plants of chemical industries located in and near Chicago.

The courses in general chemistry give a knowledge of the natural occurrence, methods of preparation, properties and reactions of the important elements and compounds, explain these facts according to modern theories, and point out their application to industrial processes. The greater part of the laboratory work is qualitative, but it includes quantitative experiments involving both gravimetric and volumetric methods, and also a few inorganic preparations on a somewhat elaborate scale. Lectures and recitations, four hours a week; laboratory work, six hours a week. Reference book, Newth's Inorganic Chemistry. Prerequisite: *Physics* 1-3.

1. General Chemistry. Chemical change, three states of matter, solution and crystalization, elements and compounds, oxygen, hydrogen, and the elements of the chlorine group.

2. General Chemistry. Continuation of Course 1. The remaining non-metallic elements; acids, bases, and salts; electrolysis.

3. General Chemistry. Continuation of Course 2. The metals. Qualitative analysis is not taught, but some of the more important analytical reactions are studied, so that at the end of the course the student is expected to be able to recognize any simple salt and to understand the methods of separation of various groups and elements.

Students who have credit for the chemistry course of the ordinary high school are required to take the lecture and recitation work of 1 2, and 3, but special laboratory work is arranged for them in the winter quarter. If they show suitable proficiency, they are excused from laboratory work for the rest of the year.

The courses in qualitative analysis begin with simple analysis and lead to the study of complex mixtures, minerals, alloys, etc. The lectures treat in considerable detail certain selected portions of theoretical and physical chemistry, special reference being made to those principles which form the basis of analytical chemistry. Laboratory work, lectures, and recitations, ten hours a week. Text-book, Prescott and Johnson's Qualitative Analysis. Prerequisite: *Courses* 1-3.

4. QUALITATIVE ANALYSIS. Classroom work on the principles of analysis. General qualitative analysis.

5. QUALITATIVE ANALYSIS. Continuation of Course 4. Lectures on theoretical chemistry.

Courses 6 and 9 give the general methods of quantitative analysis. Courses 10 and 11 give the application of these methods to the problems of particular industries. The work is largely individual, and is supplemented by the reading of special works treating the respective subjects. Laboratory work, ten hours; lectures and recitations, two hours a week.

6. QUANTITATIVE ANALYSIS. Continuation of Course 5. Simple gravimetric and volumetric determinations leading to Course 9. Lectures and recitations on quantitative analysis.

9. QUANTITATIVE ANALYSIS. Moderately complex separations, volumetric precipitations, and oxidation and reduction.

10 and 11. QUANTITATIVE ANALYSIS. The application of the general methods of quantitative analysis to specific industrial products.

12. ANALYSIS OF ENGINEERING MATERIALS. The chemical tests commonly employed by engineers, including coal and gas fuel value determinations, flue gas analysis, lubricating oil tests, etc. Lectures on metallurgy are given as a part of this course. Prerequisite: *Courses* 4 *and* 6.

Physiography and Geology

In the courses of physiography and geology, lectures, recitations, and laboratory methods of work are used. The aim in physiography 1, 2, and 3 is to give a broad introductory course that shall open up the field of science and give the student a notion of its methods and scope. Physical geography is made the central subject. The study includes observations on the heavenly bodies, such illustrated lectures and laboratory exercises as are necessary for the student to make good use of his observations, lecture table demonstrations and laboratory exercises on the elementary physical and chemical phenomena fundamental to understanding the problems taken up in the physical geography, and, finally, a study of life with especial attention to the physiographic control of the distribution of life and of man's activities.

1. PHYSIOGRAPHY. The distribution of matter in space. The celestial bodies, their number, their size, distances, materials (kinds, and amount compared with space), physical conditions, arrangement in space and motions, with emphasis on the motion of the earth and its relations to the sun and moon; elementary meteorology and climatology; oceanography. The study of a certain amount of physics is in-

cluded: Density, pressure in liquids and in air, barometric phenomena, kinetic theory of gases, diffusion, properties of vapors, thermometry, change of state, transference of heat, specific heat, latent heat, atmospheric electricity. It is believed that there is economy in studying the broader principles first and their broader applications in connection with the more immediate applications in the study of physical geography.

2. PHYSIOGRAPHY. Constituents of the atmosphere and their relations to life; oxidation, carbonation and hydration in the belt of weathering and their effects on the atmosphere and on climate; the work of underground water in solution and deposition from solution; crystalization; soils and the relation of plants to underground water and to soil; the modern doctrines of the origin and development of the surface features of the earth, the agencies involved, the resulting forms and the great examples of these forms; a study of the topographic features of the continents. The elementary chemistry involved is studied as it is needed.

3. PHYSIOGRAPHY. A study of life and life processes. Especial attention is given to the distribution of life on the earth, its relation to soil, to topographic and climatic features and the control of these things over man. Frequent references are made to these subjects in the fall and winter quarters. They are here taken up in more systematic fashion.

4. GENERAL GEOLOGY. The elementary features of dynamical structural, and historical geology. Emphasis placed upon the leading facts and principles of the science and the more important events of geological history. For college students.

Prerequisite: *Courses* 1, 2 and 3; *Physics* 1-3 and *Chemistry* 1-3, or their equivalent.

Physiology and Bacteriology

1. PLANT PHYSIOLOGY and botany of food plants.

2. PHYSIOLOGY AND PERSONAL HYGIENE. Human anatomy and physiology from lectures, text, and illustrative material. Points of contact between the study of physiology and subjects which concern practical conduct, e. g., physical training, diet, reaction of body to immediate environmental conditions, conservation of nervous energy.

3. BACTERIOLOGY. A laboratory course dealing with bacteria, yeasts and molds. Studies in morphology, physiology and reproduction; making of culture media, of permanent mounts; exercises in elementary analysis of air, milk, water, etc., from different sources.

Domestic Economy

The courses in Domestic Economy are planned with reference to the needs of two classes of students: (1) Young women who are preparing to teach cooking and sewing; (2) Girls who wish to acquire a knowledge of the household arts in connection with other academy studies.

The teachers' courses in domestic economy are of college grade and presuppose a high school training. During the second year all students are required to teach classes in cooking and sewing. These practice classes are usually formed in neighboring social settlements.

Excursions to various points of interest in the city are planned at intervals during the year. These include visits to a flour mill, to a wholesale bakery, and to a large market, as well as to the stockyards, to the Field Columbian Museum, and to the Board of Health laboratories.

No school uniform is worn, but wash waists and uniform aprons are required for cooking classes.

While the Institute does not engage to obtain positions for its graduates, many calls are made upon it to suggest candidates for positions of all kinds, and it co-operates with its graduates in securing openings for them.

Following are the courses of instruction that are offered in this department:

A, B, C. SEWING. Courses designed for the younger pupils. They include the taking of measurements and the cutting and making of undergarments, shirtwaists, thin gowns, and dressing-sacks. Use of machine with simple attachments. Talks on materials and implements used.

A2, B2, C2. SEWING AND MILLINERY. A continuation of A, B and C. Calculating the amount and cost of material required, and the planning, cutting, fitting, and making of two complete garments each quarter.

D, E, F. SEWING. Courses designed for those who are preparing to teach; include, in addition to the sewing defined under A, B, and C, drafting, the study of textiles. and the principles of design. Simple designs in flat colors, such as borders, rugs, etc.; color harmony; lettering for monograms; proportions of the human figure; sketching from life; designs for undergarments, waists, dresses, hats, etc.

G, H. I. SEWING AND MILLINERY. A continuation of D, E, and F. Making of unlined dresses, hats appropriate for the different seasons. Design as applied to decoration and stenciling. Textiles and weaving. The teaching of sewing and millinery in the elementary and secondary schools. A short, practical course in laundry, including lectures.

J. ADVANCED DRESSMAKING. Drafting and making of lined dress, either wool or silk, requiring more difficult problems. Prerequisite: *Courses* D to J.

K. TEXTILES. Lecture work, the historical development of the textile industry, the climatic conditions, and the manufacture of fabrics.

L. TEXTILES. Laboratory work. Experiments in dyeing. Weaving of various kinds.

M. APPLIED DESIGN. Embroidery for underwear and dresses, table covers, sofa pillows, mats, etc.

1, 2. COOKING. Courses designed for the younger pupils. Manufacture, selection, and preparation of food. Marketing, cooking, and serving.

3. HYGIENE AND PHYSIOLOGY. A brief course in physiology, with hygiene, home nursing, and sanitation.

4. COOKING. Course designed for those who are preparing to teach. Nature and uses of food, and changes effected by heat, cold, and fermentation; uses and application of preservatives.

5. COOKING. A continuation of 4. Principles of the selection and preparation of of foods. Care and manufacture of food.

6. COOKING. Applied dietetics. Invalid and institutional dietaries. Demonstrations, marketing, serving. Prerequisite: *Courses* 7 *and* 8.

7. FOOD AND DIETETICS. A study of the composition and nutritive value of foods. Simple food chemistry. The right application of heat to food. Prerequisite: *Chemistry* 1-3.

8. FOOD AND DIETETICS. A continuation of 7. Diet and dietaries. The detection of adulteration and preservatives in food.

9. THE HOUSEHOLD. Evolution of the house and of the family. A special study of woman's changing economic position and its effect upon the family.

10. SANITATION, HOUSEHOLD AND PUBLIC. The dwelling; its construction and furnishing in relation to health problems. Relation of germ life to water, ice, and milk supplies and to other foods, both uncooked and preserved by various methods. The prevention of common and transmissible diseases. Lectures and reference work, field excursions. Prerequisite: *Bacteriology* 3.

11. INSTITUTIONAL MANAGEMENT. Discussion of such problems as the kitchen and dining room equipment for the home and various types of institutions. A study of the duties of dietitian. Practice work in planning and keeping household accounts, the preparation and serving of meals is obtained by a lunch room serving from thirty to forty people daily in charge of the class. Prerequisite: *A knowledge of cookery.*

12. INSTITUTIONAL MANAGEMENT. A continuation of 11.

13. THE HOUSE. A study of the furnishing and management of the house from the artistic, practical, and economic standpoints. Methods of keeping household accounts. The cost of living and the apportionment of the income.

14. TEACHING OF DOMESTIC SCIENCE. Discussion of different types of equipments, of content of courses in domestic science for various school grades, and of lesson plans. Supplementary reading required.

15. SPECIAL PROBLEMS IN DOMESTIC ECONOMY. The work in this course may be along any line connected with the subject according to the preference of the student and will be in charge of the instructor under whom the work chosen would naturally fall.

History and Economics

The courses in history, as outlined below, are designed to secure three results: first, a knowledge of the important facts of history; second, a method which shall lead the pupil to think historically and to use historical material correctly; third, an interest in the subject which shall continue beyond the school or college courses.

Five courses are given in economics and industrial history. The instruction is designed to enable students to trace the development of industry and at the same time to study economic theories and principles and to apply them to the problems of modern industry.

1. ANCIENT HISTORY. The history of the Eastern nations, Egypt, and Greece to the beginning of the Peloponnesian war. Includes a study of the geography of the Mediterranean basin and the Euphrates valley, the characteristics of the various nations, and their contributions to civilization.

2. ANCIENT HISTORY. The history of the Mediterranean lands from the beginning of the Peloponnesian war (431 B. C.) to the close of the Punic wars. A special study of the later development of the Greek states, the rise of Macedonia, the empire of Alexander, Rome's rise to supremacy in Italy, and the contest with Carthage.

3. ANCIENT HISTORY. The history of Roman rule from the end of the Punic wars (146 B. C.) to the death of Theodosius. Particular attention given to the fall of the Republic, the development of the imperial system, the rise and organization of the Christian Church, and the causes of the decline of the Empire. A rapid survey of the history of West Europe from 395 A. D., the death of Theodosius, to 800 A. D., the crowning of Charles the Great.

4. AMERICAN HISTORY. The European and English background of American history, the conditions that led to the discovery of America, the colonization of the Americas, the history of the English colonies, the Revolution and the separation from the mother country, the institution of confederate government and its failure.

5. AMERICAN HISTORY. The creation of the Constitution and the organization of the new national government, the development and meaning of national political parties, the foreign relations leading to the War of 1812, the further political and industrial growth of the nation, the rise of sectionalism due to the development of divergent systems of labor and industry in North and South, the culmination of the sectional contest, the Civil War.

6. AMERICAN HISTORY. The results of the Civil War, the work of national reconstruction, the final conquest of the West, the rise of the new industrial order, the political and social problems resulting from it, the Spanish War and the abandonment of the policy of national exclusiveness, America as a world power.

7. MEDIAEVAL EUROPE. An outline course in general European history covering the period from the reorganization of the Roman Em-

pire under Diocletian to the close of the fifteenth century, treating in such detail as the time will permit the civilization and institutions peculiar to the period.

8. MODERN EUROPE. From the beginning of the sixteenth century to the present time. This course is planned to articulate with course 12 and therefore proportionately less time will be devoted to the period after than to that before 1815.

9. ENGLISH HISTORY. An outline course in English history from the earliest times to the present day. Such emphasis as the scope of the course permits will be placed upon the modern period and the career of imperial England.

10. PRINCIPLES OF POLITICAL ECONOMY. Designed to give a working knowledge of the principles of Political Economy. An exposition of the laws will be given in class lectures. The practical working of these laws will be tested by assigning problems for solution.

11. ECONOMIC SURVEY. Intended to serve a double purpose; first, to give those students who cannot devote more time to the subject a general survey, and secondly, to give a foundation for further specialization to those who may desire to pursue the subject further. The topics discussed are Money, Credit, and Banking; Foreign Exchange; the Tariff Question; the Labor Movement; Monopolies; the Railroad Problem; Taxation and Tax Reform; and Socialism.

12. LABOR PROBLEMS. The purpose of the course is to present the labor problems of to-day, and to note the progress made in finding a solution for each. Some of the subjects discussed are arbitration and conciliation, employers' liabilities, workingmen's insurance, women in industry, and child labor. A comparative study will be made of the labor laws of the leading industrial countries, including the United States and the various individual states.

13. AMERICAN CONSTITUTIONAL HISTORY. The Convention of 1787, the organization of the federal government, the development of the national judiciary, the state-rights controversy, and other important constitutional topics will be studied. This is not a narrative course, but is designed for those who have completed 7, 8, and 9, and for other mature students.

14. INDUSTRIAL HISTORY OF THE UNITED STATES SINCE THE CIVIL WAR. This course will aim to place emphasis upon the industrial development of the United States since the Civil War and to point out the industrial factors which are making the United States of to-day. The subjects discussed are: The economic and social state of the nation in 1865, the commercial and industrial demoralization in the South at the close of the war, the industrial transformation of the South, the race problem economically considered, the conservation of material resources, the industrial factors making for federal as contrasted with state supremacy.

15. MUNICIPAL PROBLEMS. The course aims to present the many problems connected with the government and control of our large cities. The subjects discussed are: Municipal home rule, municipal franchises, and public utilities. The course is designed for mature students.

Philosophy

1. Introduction to Philosophy. The meaning of the word "philosophy" as used in academic circles to-day; the nature of reflective thought as compared with ordinary thought, scientific thought, and poetic thought; the chief philosophical problems; the chief types of philosophic doctrine. [The course is open to sophomores and juniors. A certain amount of reading in psychology is presupposed and required. Students who intend to elect the course in the spring are requested to consult with the Dean of College Students at the opening of the year in order to arrange for this reading.]

English

The first nine courses outlined below are required of every candidate for the academy certificate. They are equivalent to the three units mentioned on pages 12 and 13.

The remaining nine courses are collegiate.

Each course has its particular topic of emphasis, but each is designed to be a course in "English," in a liberal and practical sense of the word. Each involves applied grammar, composition, oral reading, public speaking, and literature. The work in public speaking is correlated to some extent with the study of civics and economics.

In Courses 1 to 6 the text-books at present used are as follows: Lewis, First Manual of Composition, revised edition; Lewis, Introduction to the Study of Literature; Moulton, Old Testament Stories; Shakspere, The Merchant of Venice, edited by Miss Underwood; and numbers 21, 40, 27, 37, 133 in the Riverside Literature Series, being selections from Franklin, Hawthorne, Thoreau, and Warner, with Schurz's Life of Lincoln. These books are referred to below by abbreviations.

1. Average sections cover First Manual, I., and Moulton. Special sections omit Moulton and receive more drill in speaking and writing.

2. Average sections cover First Manual, II., and Introduction, I.-V. Special sections take fewer chapters of literature and more drill in speaking and writing.

3. Average sections cover First Manual, III., and Introduction, VI.-X. Special sections abbreviate Introduction.

4. Average sections cover First Manual, IV., Franklin (21), Thoreau (27), and Hawthorne (40). Special sections omit 21 or 27, or both.

5. Average sections cover First Manual, V., Schurz's Lincoln (133), and Warner (37). Special sections omit 37.

6. Average sections cover First Manual, VI., and The Merchant of Venice.

1-6. Composition. Students who for whatever reason have not attained the degree of correctness required for entrance to Course 7 are assigned to Course 1-6, which amounts to a review of all preceding work in writing and speaking English.

7. Shakspere's Macbeth; Milton's L'Allegro, Il Penseroso, Comus, and Lycidas; Burke's Speech on Conciliation with the American Colonies; Macaulay's Life of Johnson, or Carlyle's Essay on Burns.

8. Composition. The work is based on Lewis's Second Manual of Composition.

9. Shakspere's As You Like It, and Julius Caesar; Addison's Sir Roger de Coverley Papers; Goldsmith's The Deserted Village; Dicken's A Tale of Two Cities; George Eliot's Silas Marner; Irving's The Sketch Book; Ruskin's Sesame and Lilies; Arnold's Sohrab and Rustum; Tennyson's Gareth and Lynette, Lancelot and Elaine, and The Passing of Arthur.

10. English Composition. This course lays stress upon the structure of the whole composition, the paragraph, and the sentence. It affords practice in writing by numerous exercises and themes.

11. English Literature. The practice of composition is continued throughout the course in the form of daily summaries of assigned prose masterpieces. The work of the classroom includes (a) lectures on the nature and functions of literature, (b) the learning of a considerable body of English verse, and (c) the interpretation of important short poems.

12. Shakspere. Dowden's Shakspere Primer, Hudson's School Edition of Romeo and Juliet, Hamlet, King Lear, Antony and Cleopatra, Coriolanus, The Tempest.

13. English Composition. Required of all candidates for the associateship in arts. The work is carried on by means of lectures, textbooks, written exercises, and personal consultation. Thirty-five themes are written, illustrating a variety of definite tasks.

14. The English Essay. A rapid survey is attempted of the history of the essay as an exponent of English life and thought. The authors especially studied are Hazlitt, Lamb, Landor, Newman, Carlyle, Emerson, Ruskin, Arnold, Stevenson. Each member of the class will provide himself with Emerson's Essays, first and second series. For the other authors the student will be able to use the special library of duplicate volumes provided by the Institute for this course. *(Not given in 1910-11; given in 1911-12.)*

15. Milton. A study of the Paradise Lost, preceded by the reading of Lucretius and Dante in translation, and accompanied by lectures on the cultural epochs represented by these philosophical poets. *(Given in 1910-11; not given in 1911-12.)*

A, B, C. English for Engineers. The chief object of Courses A-C is the attainment of clearness and accuracy in the writing of English. Among the tasks required are narratives of shop visits; narratives of personal experience in building or repairing machinery; descriptions of machines; expositions of engineering principles; the study of the vocabularies of engineering and of business law.

German

The methods employed in this department are intended to establish a broad and thorough foundation for three purposes: first, an appreciative study of German life and literature; second, the reading of scientific works in German for information; third, a practical command of the language.

Courses A-I cover a period of three years for academy students. Courses 1-12 cover a period of four years for college students.

Accurate and intelligent pronunciation is considered a valuable means for securing accuracy in inflection and fluency in speaking. Colloquial practice is introduced at the outset, taking at first the form of simple questions on the text, and increasing in difficulty until the entire recitation is conducted in German.

Translation from German into English is regarded as a means to an end, and is discarded when it is no longer needed as a test of the understanding of the text.

In composition direct translation from English into German is employed to some extent, but preference is given to reproductive exercises and independent themes. Exercises of this sort are required at least twice a week throughout the course.

The simpler principles of historical grammar are presented incidentally at an early stage in the course, and constant reference is made to the relation between English and German.

A. B. Elementary German. Drill on pronunciation; the inflection of nouns, adjectives, pronouns, and the simpler forms of verbs. Easy prose reading.

C. Elementary German. Grammar continued. Verb forms emphasized. Easy prose reading.

D. Readings in Easy Narrative Prose. Continued drill on grammatical forms. Prose composition based on texts read.

E. Narrative Prose and One Easy Comedy. Reproductive translation into German. Conversational exercises.

F. Modern Prose Readings. Reproductive translation and independent themes.

G. Modern Prose.

H. German Prose Composition. Pope's text-book.

I. A Modern Novel, and Schiller's Wilhelm Tell.

1, 2, 3. Elementary German for College Students. Thomas's Grammar, Part 1. Leander's Traumereien. Schweitzer-Simonnot's Lesebuch für Quarta und Tertia.

4. Historical Prose. An essay, a novel, and a drama.

5. Prose Composition and Themes.

6. Modern Novels. Ebner-Eschenbach, Freytag, Sudermann.

7, 8. Schiller's Life and Works.

9. The Modern Drama. Kleist, Grillparzer, Hebbel.

10, 11. Life and Works of Goethe.

12. Dramas of Hauptmann and Sudermann.

French

The elementary work in French (Courses 1-4) is adapted to the requirements of college students who wish to begin French, and is done in the time usually assigned to it in colleges which offer elementary French.

High school students who have had two or three years of Latin may be admitted to these classes if their other work is so planned as to allow the requisite time for preparation.

Accurate and intelligent pronunciation is considered necessary to an intelligent understanding and speaking of the language. Exercises prepared to secure these results are required both in the preparation of the lesson and in the classroom. Idiomatic conversation is introduced at the outset and continued until the whole recitation can be carried on in French. A minimum amount of translation from French into English is accepted, and only as a test of the understanding of the text.

For prose work, dictations, reproductive exercises, and themes are preferred to translating from English into French.

1. ELEMENTARY FRENCH. Rudiments of grammar; careful drill in pronunciation; memorizing of easy expressions and proverbs; reading of anecdotes and short selections. Grammar: Beginner's French, Francois.

2. ELEMENTARY FRENCH. Grammar: special attention given to irregular verbs and idioms; frequent conversational exercises; prose composition based on texts read. Grammar: Fraser and Squair for reference. Reading: Francois and Giroud's Simple French. Sans Famille (Malot), Le Petit Chose (Daudet).

3. MODERN SHORT STORIES. Texts for the quarter will be selected from the following: Le Tour de la France (Bruno), Colomba (Mérimée), Jeanne d'Arc (Lamartine), Le Pays de France (Foncin), Histoire d'un Paysan (Erckmann et Chatrian), Les Normands en Angleterre et en France (Thierry), Grandes Découvertes Modernes (Muller). Prose and conversation based on texts read.

4. MODERN FRENCH COMEDIES. Texts for the quarter will be selected from the following: Moi (Labiche et Martin), Le Luthier de Crémone, Le Tresor (Coppée), Mlle. de la Seigliére (Sandeau), Le Voyage de Monsieur Perrichon (Labiche et Martin). Frequent resumes and abstracts of portions of texts read, dictations, and conversational exercises.

5. THE ROMANTIC SCHOOL, WITH SPECIAL STUDY OF VICTOR HUGO. Reading: Quatrevingt Treize, Hernani, La Chute, and other works of the period. Prose; frequent reproductive exercises; letters, business and friendly, twice a week.

6. MOLIÈRE. A careful study of his chief comedies and ideas. Reading: Le Bourgeois Gentilhomme, L'Avare, Les Precieuses Ridicules. Dictations; abstracts or reproductions from memory of texts read. Themes in French.

7. The Classic Drama: Corneille, Racine. Reading: Le Cid Polyeucte (Corneille); Athalie, Andromache (Racine), with some attention to the conditions of the stage and literary production in the time of Louis XIV. Dictations; practice in giving French paraphrases of portions of texts read; themes; collateral reading in different literatures.

8. French Classic Prose. Pascal, La Rochefoucauld, Bossuet, La Bruyère, Madame de Sévigné. Reference work in literature and Sainte Beuve, Taine, Brunetiére, Lemaitre. Themes based on subjects

9. Critical Prose of the Nineteenth Century and Essayists. Sainte Beuve, Taine, Brunetiére, Lemaitre. Themes based on subjects suggested by the reading.

Latin

The course of study in this department includes, in addition to the usual four years of training preparatory for college, all the work in Latin regularly required in the best colleges for the degree of A. B.

Literature is studied historically as an expression of the life of the people and with reference to the times and the circumstances under which the writers lived, and in the more advanced classes attention is paid to the elements of style and of literary criticism. Systematic supplementary reading is encouraged, for which ample opportunity is offered by a carefully selected library. The work of the classes is supplemented by stereopticon lectures illustrating the monuments of Rome, Roman antiquities, historical sites, and Roman private life.

1, 2. Elementary Latin.

3. Elementary Latin. Selections from Ritchie's Fabulæ Faciles.

4. Selected Fables and Stories from Roman history.

5, 6. Selections from Caesar's Gallic War.

7, 8. Cicero, Orations Against Catiline. A study of the political and social conditions in Rome at the end of the Republic. In the work of Latin writing special attention is paid during these two quarters to the writing of continuous narratives.

9. Cicero, Pro Archia; Pro Marcello; Selected Letters. Prose writing as in Courses 7 and 8.

10. Virgil, Aeneid, I., II. Special care given to the literary quality of the student's translations. Translations at sight, and weekly exercises in Latin writing.

11. Virgil, Aeneid, III., IV.

12. Virgil, Aeneid, V., VI. General review. Latin writing.

13. Livy. Selections from Books XXI to XXIX, presenting Hannibal's campaigns from Saguntum to Zama. Latin writing.

14. Horace. Selections from the Odes and Satires. Review of the period preceding the accession of Augustus; a study of conditions affecting the literature of the Augustan age; lectures upon the life and times of Horace; committing to memory of choice odes. Reading aloud with

due attention to quantitative predominance as a means of arousing an appreciation of the music of Horace's verse.

15. LATIN COMEDY. Plautus and Terence. Captivi, Menæchmi, and Phormio.

16. PLINY'S LETTERS, supplemented by reading of Juvenal's satires and Martial's epigrams.

17. TACITUS. Agricola, Germania, and selections from the Annales.

18. CICERO. De Amicitia and De Senectute. LUCRETIUS, De Rerum Natura.

Greek

1. ELEMENTARY GREEK. The essentials of the grammar, with illustrative sentences in Greek and English. Selections from the Anabasis.

2. XENOPHON, ANABASIS, Book I. Composition; grammar. The modification of verbal stems, euphonic changes, and drill in principal parts of irregular verbs.

3. XENOPHON, ANABASIS, Books II., III., IV. Greek writing; grammar.

4. HOMER, ILIAD, Books I., II., III.; selections from IV.-XXIV.

5. HOMER, ODYSSEY; selections from Books I.-XIII.

6. PLATO, APOLOGY AND CRITO. XENOPHON, MEMORABILIA. Greek writing.

Decorative Art

This department offers instruction in elementary drawing and painting, illustrating, designing, metal work, and pottery. The aim of the instruction is to acquaint the student with practical methods in the handling of materials in the different mediums. There are general courses planned for all students, but an effort is made to suit the work to the individual as far as possible. Advanced work in tooled leather, wood-carving, and stenciling will be given as demand rises.

1. FREE-HAND DRAWING. Drawing in charcoal from casts of features, hands, feet, and simple heads, and of geometric solids; simple designs in color, such as panel, allover designs, rugs, book-covers, etc.; fifteen minute sketches from life.

2. FREE-HAND DRAWING. Drawing in charcoal in outline and in light and shade from heads and architectural details; sketching from life in pencil and in pen and ink; designs for book-plates, headings, letterings, illustrations, etc., in pen and ink.

3. FREE-HAND DRAWING. Charcoal drawing from casts of heads and figures and from heads from life; water-color from still life and flowers, etc.; designs for vases, cups and saucers, wall-paper, stained glass, etc.

METAL WORK AND JEWELRY. The course consists of hammering, saw-piercing, soldering, riveting, braising, etching, engraving, repoussé work, coloring of metals, setting of stones, etc. The designs are made with a view to the nature of the metals used. Work is done in gold, silver, copper, and brass.

The classes in decorative metal work meet on Tuesdays and Fridays from 9 to 3. The tuition fee is ten dollars for five hours a week for twelve weeks. Pupils are required to provide a set of tools at their own expense.

POTTERY. The production of artistic pottery. The instruction will be adapted to the special needs of teachers. The course includes: throwing vases by hand on the wheel; finishing vases preparatory to decorating in underglaze colors and relief designs; composition of pottery bodies, and application of underglaze colors and glazes; firing of bisque and glazed ware. Instruction is also given in the principles of ornamental and constructive design.

The tuition fee is ten dollars for five hours a week for twelve weeks.

Physical Culture and Athletics

The equipment for physical culture and athletic activities comprises a men's gymnasium, 90x40 feet, a girls' recreation room, a twelve-lap outdoor running track, and a tennis court. Ample bathing and gymnasium locker facilities are also provided.

The men's gymnasium and the girls' recreation room are open from 9 A. M. to 6 P. M.

Gymnasium work is not compulsory, but students may elect a special or a general course in gymnastics. Classes are arranged at such hours as not to conflict with regular school duties.

All athletic games and sports are practiced under the supervision of the instructors in athletics and a committee of the Faculty. Only such games are encouraged as are in harmony with the educational aims, ideals, and environment of the Institute.

Courses of Instruction for Shop Apprentices

Mechanic Arts

MACHINE DRAWING AND SKETCHING. The aim is to familiarize the student with drawings and to enable him to read them, rather than to make of him a draftsman.

1. *First Year.* (1) Sketching, lettering, rules of perspective, dimensioning. Individual work upon valve patterns, pillar blocks, ring oiler bearings, hangers, drill presses, and pumps. (2) Freehand and mechanical drawing. Plan and elevation sketches of details with dimen-

sions, finish marks, notes, etc. A study of the working drawing in freehand. (3) Machine sketching. Original work on detail and assembly sketches. Subjects: Three chamber oil pump, rotary pump, gas engine, etc.

5. *Second Year.* (1) Mechanical drawing, lettering. Instrumental practice, standard screw threads, convention threads, and tracing. (2) Machine drawing. Detail drawing of simple machine parts. The making of shop or working drawings. Assembly drawings. Tracing. (3) Gearing and cams. A study of the curves used in gears. The drawing of simple gears. Study of the principles of cams and the drawing of simple and typical cam problems.

MACHINE SHOP PRACTICE. The work in the machine shops is intended to give the student an understanding of the principles employed in the various processes used in modern machine tool operation. The construction and methods of manipulation of the various machines are explained; and the mechanisms used by different builders of similar tools, to obtain the speed and feed changes, are examined and described. The different forms of cutting tools are described, and the importance of grinding with the proper clearance and rake is shown.

20. *First Year* (1 and 2), *Second Year* (3). Practice is given on the engine lathe, speed lathe, planer, shaper, universal miller, vertical boring mill, universal grinder, and drill press; in the fundamental operation of centering, turning, chucking, boring, reaming, thread-cutting, planing, plain and index milling, cylindrical grinding and drilling; in the construction of machine parts and tools. The instruction in the operation of the machines is largely individual, and the work done depends upon the ability of the student.

FOUNDRY WORK. The course in foundry work is given largely for the purpose of acquainting the student with the usual methods of founding various metals, especially the making of machine castings of gray iron and brass. The Institute foundry is conducted very much as a jobbing foundry, and students are required to work in all departments.

4. *First Year* (3). Bench and floor-molding, core-making, cupola and crucible furnace melting, pouring off, cleaning castings, etc. Frequent shop talks are given on the relation of the foundry to the drawing room, pattern shop, and machine shop. Shop visits are made to both light and heavy jobbing foundries, and also to a number of factory foundries in the city. These visits are an important part of the course, and students are required to make written reports of them. Lectures are given on the location, arrangement, and equipment of foundries, as well as on the materials used in the making of molds and castings.

FORGE WORK. The end sought in this course is a knowledge of the working of steel of different grades, something about proper methods of heat treatment, and above all, how to build a fire in a common forge and keep it under control. Demonstrations and talks are given on manufacturing processes and the relation of different products of iron and steel in composition; also on brazing, soldering, and case-hardening.

3. *Second Year* (2). The ground covered includes: Several exer-

cises in machine forging, drawing out, upsetting and bending into shapes, such as eyes, square bends, and odd shapes; exercises in welding, designed to teach the student to recognize the welding heat and how to get it. Work in tool steel, such as the making and tempering of punches, scribers, chisels of all kinds, lathe tools and tools used in the forge shop. The making of hot and cold chisels, hardies, set hammers, etc., gives the students the use of these tools in the shop, also the use of fullers, swages, and the steam hammer.

PATTERN MAKING. The work in the pattern shop is designed to familiarize the student with the use of working drawings from which patterns are made, and to give practice in the care and uses of hand tools and pattern making machinery.

Second Year (1). Study and application of methods of joining woods to prevent warping, by the use of strips, segments, staves, etc.; the uses and preparation of shellac and glue as applied to pattern making, and the meaning of trade terms. The necessity and meaning of draft, finish, shrinkage of metals and its effect on different shaped castings. Illustrated lectures on woods and their characteristics. Exercises in planning and laying out work, and wood turning as applied to pattern making in the construction of typical patterns and core boxes, designed to demonstrate some principle and requirement necessary in the production of castings in the foundry.

Mathematics

SHOP MATHEMATICS. The work of this course is planned to give a ready command of the principles of mathematics in dealing with the problems that arise in shops and factories. The importance of short methods and common sense checks is emphasized, and as far as possible the memorizing of rules and processes is avoided.

1c. First Year. Arithmetic: Addition, subtraction, multiplication, division, common and decimal fractions, proportion, percentage, square root, mensuration. Use of slide rule. Problems in work, power, electricity, belting, pattern making, and foundry work, gears, speeds and feeds, forgings, areas, and volumes.

2c. Second Year. Algebra: Elementary processes, equations, formulas, logarithms. Use of squared paper. Angle-functions. Problems in specific gravity, heat, strength of materials, stresses, steam and gas engine practice.

Physics

ENGINEERING PRINCIPLES. The aim of this work is to make the student acquainted with the fundamental principles of physics, to cultivate correct methods of thought concerning natural phenomena, and to apply the principles of mathematics to the results of experiments. The laboratory is well equipped with modern commercial apparatus, selected with the idea of its usefulness. Each of the sixteen benches is supplied with direct and alternating current, compressed air, gas, water, and a switchboard consisting of a milli-voltmeter and its shunts, high and low-reading voltmeter, and lampbank. Four students can be accommodated at a bench, but two is the usual number.

1c. First Year and Summer. The courses comprise the general subjects of mechanics, sound, heat, light, and electricity. Each week there are five lectures and five laboratory periods of one hour each. The apprentices attend the general lecture with the regular day students, but they are in a laboratory class by themselves. About two hundred different experiments are worked, all bearing a close relation to the events of every day life. A few of the typical subjects worked in the laboratory follow:

In mechanics: Roof truss, crane stresses, tackle efficiency, helical spring, hydraulic ram, water motor, pressure gage calibration, calibration of water meter, planimeter and steam engine indicator card. In heat: Experiments on latent heat and specific heat, emissivity, tests of fuel gas stove, alcohol stove, and electric stove. In sound: Measurements of the velocity of sound, of the pitch of tuning fork, of wave length, and the scales of different stringed and wind instruments. In light: Curvature of lens, spherical mirror, construction and use of a sextant, distribution of candle power. In electricity: Wheatstone bridge, telephone circuits, battery testing, direct current arc lamp, incandescent lamp target, direct current instruments, Wright discount meter, Wattmeter, motor efficiency, test of motor generator set.

2c. Second Year (1). A course devoted to the apparatus of the steam plant. The apprentice is given instruction in the care, operation, test, calibration, and adjustment of the steam engine and other apparatus from the point of view of economical operation. Especial attention is given to the steam engine indicator, use of steam tables, and to fuels. (2) A short course in the application of the principles of mechanics to shop problems, especially in friction and the strength of materials. A few tests for strength of materials. A systematic study of motion as applied to gears, cams, linkages, and belted connections. The principles learned in this subject are employed in the drawing course of the Spring Quarter. (3) Shop arrangement and organization. Arrangement of machines to secure economical production, methods of driving, transmission of power, routing of work, costs, organization, and shop records.

Chemistry

1c. Summer. Twenty-five demonstration lectures of one hour each and twenty-five hours of laboratory work. The lectures will cover the fundamental principles of the subject. The purpose is not to give a complete course in general chemistry, but rather to supplement the work in physics, and at the same time to make the instruction of use to those who do not take any more chemistry, as well as a foundation for those who may go on with the subject. The laboratory work is designed to give the students some experience in handling chemical apparatus, by performing such experiments as are necessary to prove some of the fundamental laws, and to help to a better understanding of the lectures.

English and History

Two Years (1c. and 2c.) The principle of correlation is one that is specially emphasized in the work in English. Letters, themes, speeches and discussions are based upon work done in other classes, in the school shops and in the workshop, and upon the subjects taken up in literature and industrial history. It is hoped that this method may help to give the student a sense of the unity and organization of his various activities and do away with the pigeon-hole idea of the different aspects of his school work.

The two years of class room work in English include the following subjects:

Composition. Considerable practice in writing, chiefly in the form of short themes. The students have at least three written exercises a week, which include drill in sentence form and the rules of grammar, spelling, and punctuation. Some are formal exercises to test the student's progress in the grasp of rules and principles. Some are free compositions or themes, partly upon assigned subjects and partly upon subjects chosen by the student himself. The theme work concerns itself with the student's own experience—incidents of shop or home or school life. The object is an accurate, clear, and forceful style. There is also practice in the various forms of letter writing, with special emphasis upon the business letter. Spelling exercises are called for, probably three or four times a week, to train the student in the accurate spelling of ordinary words, and of technical, shop, and business terms.

Literature. One period a week during at least a portion of the course, is devoted to the study of literature. Specimens of narrative prose from such authors as Malory, Irving, Poe, and Hawthorne, and typical passages of narrative poetry are taken up, the passages being read by the instructor. Discussions by the class and an occasional theme upon the passages studied are provided for. General reading by the students is encouraged and directed, and an effort is made to interest him in the school library, and to help him to the best use of it.

Speaking. One exercise a week is provided for public speaking. The student is asked to stand before the class and address it upon some subject of common interest. An effort is made to acquaint the student with the simpler principles of speaking, as applied both to thought and to delivery. The speaking on occasion, takes the form of free discussion, extemporaneous work, and debate.

Industrial History. An attempt is made in the later portion of the course to acquaint the student with the essential facts of English and American Industrial History. The chronological method is followed to some extent. The manor system, the mediaeval trade gild, the industrial revolution, the factory system, labor legislation, the development of trade unionism, and such present day topics as child labor, and employers' liability are presented. The method is that of short talks by the instructor, supplemented as far as possible by discussion, reading, and written work upon the topics dealt with.

Evening Session of 1911-1912

Officers of Administration and Instruction

OFFICERS OF ADMINISTRATION

George Noble Carman, A. M.
Director.

Philip Bell Woodworth, B. S., M. E.
Dean of Evening School

Eugene C. Hall
Registrar of Evening School

OFFICERS OF INSTRUCTION

Philip Bell Woodworth, B. S., M. E.
Professor of Physics and Electrical Engineering

Alexander Willett Moseley, S. B.
Professor of Mechanical Engineering

Herbert Edgar Cobb, A. M.
Professor of Mathematics

Fred A. Rogers, B. S.
Professor of Electrical Engineering

John Derk Nies, B. S.
Professor of Electrical Engineering

Dic Hector Trowbridge, B. S.
Assistant Professor of Chemistry

William Parker Hawley, B. S
Assistant Professor in charge of Mechanical Drawing

Justin Wyman Ludlow, M. E., C. E.
Assistant Professor of Mechanics

Katherine Isabel Ingersoll
Assistant Professor in charge of Sewing and Millinery

Minna Caroline Denton, A. M.
Assistant Professor of Physiology and Bacteriology

George Alexander Ross
Instructor in Woodwork

Robert Frederick Biesemeier
Frederick Lester Havens, M. E.

Horace Bernard McCabe
Instructors in Machine Shop Work

George Frederick Cassell, A. B.
Instructor in German

Judson Thomas Webb
Instructor in Pottery

Bryant White, A. B., S. B.
Instructor in Machinery Drawing

Nicholaas Prakken
Instructor in Architectural Drawing

John Henry Smale, A. B.
Instructor in charge of English and Commercial Subjects

Sherman M. Turrill
Instructor in Structural Engineering

Joseph Phippin Shaw
Instructor in Accounting

Edwin D. Leman
Lee Francis Supple
Instructors in Chemistry

Mary Kane
Instructor in Physical Culture

Charles B. Kazda
Charles R. Kolkow, S. B.
J. George Loeding
Arthur E. Van Hagan, B. S.
Frank H. Wade, M. E.
Instructors in Mathematics.

Leon E. Ashley, B. S.
Samuel E. Bird
Walter C. Buetow, B. S.
Max A. Giffey
John E. Poole, B. S.
Bernard Riffel, M. E.
Victor L. Sherman
Lloyd L. Smith, B. S., E. E., C. E.
Instructors in Mechanical Drawing

Frances Beem
Sarah Edith Cole
Ruth Crossman
Grace Lucile Hennecke
Grace Gordon Hood
Julia Grace Merrill
Bertha Louise Nixon
Florence F. Norton
Ethel J. Pond
Bonnie Elizabeth Scholes
Mildred E. Stavers
Laura M. Winkleman
Jennie D. Wyse
Instructors in Domestic Economy

Ada E. Campbell
Cora J. Kohlsaat
Malvina D. Niedermann
Clara B. Samels
Mary E. Sullivan
Instructors in English

Consiglia Bartolomei
Instructor in Italian

Maud H. Millard
Instructor in Latin

Jane Heap
Carolyn Maulsby
Instructors in Metal Work

Caroline Hammerschmidt
Instructor in Bookbindin

Walter E. Bauerle
Maurice L. Carr, B. S.
Frank F. Feeley
Adolph C. Fensholt
Harry N. Gilbert, M. E.
John D. McGrath
Elmer S. Smail
Edward E. Strauss
Richard H. R. Whitehead, M. E.
Laboratory Assistants

General Information

The evening courses are the outcome of a study of the needs of the men and women who have attended the Institute for several years past. The various attainments and demands of journeymen, mechanics, power plant and locomotive engineers, electricians, clerks, laborers, foremen, shop superintendents, salesmen, bookkeepers, firemen, nurses, stenographers and others, who are in search of specific knowledge for which they have immediate use, are not to be met by the ordinary methods of class instruction. Except when the subject may be advantageously presented by lectures and laboratory demonstrations, the instruction of necessity becomes for the most part individual in character. For this reason there are no formal entrance requirements, and students are assigned to classes upon personal consultation with the Dean and the instructors whose classes they desire to enter. For such consultation the office of the Institute is open evenings for one week before the beginning of the autumn term; students entering after the beginning of the term will find opportunity for consultation at the time of entrance.

The Institute is open from 4 to 10 o'clock Monday, Tuesday, Wednesday and Thursday evenings from October 2 to May 16.

The Library is open from 4 to 9. Most of the instruction is given from 7:30 to 9:30. The courses are so arranged as to make it possible for a student to take one course and attend one or two evenings a week, or two courses and attend three or four evenings a week.

For the convenience of teachers in the public schools certain courses in Mechanic Arts and in Domestic Economy are given from 4 to 6 in the afternoon and on Saturday mornings.

The tuition for one course of instruction, two evenings a week for a term of ten weeks, is five dollars; for two courses of instruction, four evenings a week, ten dollars.

In addition to the tuition, a fee of five dollars a term is charged for laboratory courses and for courses in the machine shop and in the wood shop.

Conspectus of Evening Courses

MECHANIC ARTS

3, 4—Mechanical Drawing, 3 terms—Mon. and Wed. 7:30-9:30; Tu. and Th. 7:30-9:30
2, 5—Architect'al Drawing, 3 “ Mon. and Wed. 7:30-9:30; Tu. and Th. 7:30-9:30
6, 8—Wood and Fdy. Work, 3 “ Saturday morning, 8:30-12:30.
10-12—Machine Shop Work, 3 “ Mon, and Wed. 7:30-9:30; Tu. and Th. 7:30-9:30
10-12—Machine and Forge. . 3 “ Saturday morning, 8:30-12:30.

ENGINEERING

AUTUMN TERM.	WINTER TERM.	SPRING TERM.
1. Engineering Principles, Mechanics, Heat, and Light. Mon. and Wed., 7-9.	2. Engineering Principles, Electricity. Mon. and Wed., 7-9.	3. Physics Laboratory, Mechanics, Heat, and Light. M. & W., 6-8 or 7-9 or 8-10
4. Electrical Laboratory, Electrical Measurements. Mon. and Wed., 7-9.	5. Electrical Laboratory, D. C. Generators and Motors. Mon. and Wed., 7-9.	6. Electrical Laboratory, Rotary Converter. Mon. and Wed., 7-9.
4*a* Steam Laboratory. Heat and Work. Tu. and Th., 7.30-9.30.	5*a* Steam Laboratory, Steam Engine, Tu. and Th., 7.30-9.30.	6*a* Testing Laboratory, Gas Engine Practice. Tu. and Th., 7.30-9.30.
7. Alternating Currents, Electrical Instruments. 10 Tu. and Th.. 7.30-9.30.	8. Alternating Currents, Transformers and Transmission. 11 Tu. and Th., 7.30-9.30.	9. Alternating Current Machinery. 12 Tu. and Th., 7.30-9.30.
13 Structural Steel Work. Mo. and We., 7.30-9.30.	14 Structural Design, Mo. and We., 7.30-9.30.	15 Concrete Construction. Tu. and Th., 7.30-9.30

MATHEMATICS

1, 2—Arith. and Accounting, 3 terms, Tu. and Th., 7:30-9;30.
3—Elementary Algebra.. 3 “ Tu. and Th., 7:30-9;30.
5-7—Algeb. and Trigonom'y, 3 “ Tu. and Th., 7-9.
4—Geometry.............. 3 “ Tu. and Th., 7-9 and 8-10.
8—Engineering Mathematics, First year—Autumn and Winter, Mon. and Wed., 7-8; Spring, Tues., 7-9.
9—Engineering Mathematics, 3 terms—Second year, Th., 7:30; Third year, Mon., 7:30.

CHEMISTRY

1. Practical Chemistry................ .... 3 terms—Tu, and Th., 7:30-9:30.
2 and 3. Qualitative and Quantitative Analysis . 3 “ Tu. and Th., 7:30-9:30.

DOMESTIC ECONOMY

1—Cooking..........3 terms { Mon. and Wed., 4-6 and 7-9; Tu. and Th., 4-6 and 7-9. Saturday morning, 8-12.
2—Sewing .... 3 “ Mon. and Wed., 4-6; Tu. and Th.. 7-9; Sat. morning, 8-12.

ENGLISH, GERMAN, AND LATIN

1—Elementary English........................ 3 terms, Mo., We.—Tu., Th. 7:30-9:30
2—Intermediate English . ... 3 “ “ “ “ “ 7:30-9:30
3—Advanced English . ... 3 “ “ “ “ “ 7:30-9:30
—German .... 1 “ Tu. and Th., 7:30-9:30
—Latin .... 3 “ Mon. and Wed., 7:30-9:30

POTTERY AND PHYSICAL CULTURE

Pottery............. .. . . 3 terms. Tu. and Th., 4-6 and 7-9; Sat., 9-12
Physical Culture for Women........ . 3 “ Mon. and Wed., 8-10.

UNIVERSITY EXTENSION LECTURES

Four Courses of Six Lectures each Thursday evenings, September 28 to March 21

Description of Evening Courses

Mechanic Arts

1. Elementary Mechanical Drawing. For beginners. Practice in lettering, dimensioning, and drawing of bolts, nuts, and fastenings. Drawing and tracing of simple machine details.

2. Elementary Architectural Drawing. For beginners. Lettering and instrumental practice. Arrangement of posts, girders, joists, and partitions. Various roofs for a given floor plan. Designing from sketches, arrangement of rooms, rise and run of stairs. Materials of construction. Design of flats and blocks, plumbing, heating, specifications, and bills of material.

3. Advanced Mechanical Drawing. Intended to supplement course 1 by more practice in machine details.

4. Machinery Drawing. The study of mechanism, gear drawing, and the general considerations underlying intelligent machinery drawing. For students who have had courses 1 and 3 and for experienced draftsmen.

5. Roof and Stair Drawing. For carpenters, joiners, and carpenter's apprentices. Work in roof framing with methods for obtaining lengths and cuts of the different rafters in a complicated roof. Design and laying out of straight, winding, and circular stairs; also eases, ramps, and goose necks for different types of architecture.

6. Elementary Woodwork. For beginners and teachers preparing to teach Manual Training. Care and uses of tools. Talks on woods and their characteristics. Construction of models.

6a. Carpentry and Joinery. Designing and laying out parts of buildings. Computing the cost of material and labor. Practice in the construction of models.

6b. Cabinet Work. Designing interior finish and furniture for buildings. Practice in the construction and finishing of furniture.

7. Pattern Making. Elementary and advanced. Machinery and architectural pattern-work.

8. Foundry Practice. Work in molding, core making, and melting, supplemented by lectures and demonstrations.

9. Machine Tool Work. Description of the construction and operation of engine lathe, planer, shaper, and universal miller; essentials of metal cutting tools; practice with these machines in fundamental operations.

10. Machine Tool Work. Further practice with machine tools, hand tools, and measuring instruments in making machine parts.

11. Gear Cutting. Practice with the universal milling machines in cutting spur, bevel, spiral, and worm gears.

12. Tool and Die Making. Practice with the lathe, planer, universal miller, and universal grinder in making reamers, taps, dies, milling cutters, drills, and other tools. Practice with machine and hand tools in making, punching, bending, and forming dies and adjusting in punch press.

Engineering

1. Engineering Principles. One hour devoted to lecture demonstrations of commercial apparatus from simple to more complex forms. Special attention given to the determination of losses in machines. One hour given to work in practical mathematics, solving problems such as the mechanic is likely to need in the use of handbooks. The demonstrations and calculations cover cranes, hydraulic elevators, centrifugals, water wheels, engines, and fuels.

2. Engineering Principles; Electricity. One hour devoted to lecture table demonstrations of electrical principles, instruments, motors, and generators. Special attention given to the determination of the losses in transmission and in machines. One hour given to work in practical mathematics, solving such problems as the mechanic is likely to meet in practical work.

3. Physics Laboratory. Covers the fundamental physics laboratory work in mechanics, heat, and light. Consists of a series of tests, such as efficiency of simple machines, horse-power tests of motors, heat efficiency of fuel gas, of electric stoves, and incandescent lamps, target diagrams, and photometric work with incandescent lamps.

4. Electrical Laboratory. Electrical Measurement Work. Consists of a series of tests such as are in common use in regular practice where voltmeters, bridges, millivoltmeters, ammeters, and wattmeters are the instruments in use. Instruments are calibrated; tests are made of line and machine insulation; and self-induction, capacity, and permeability are determined.

5. Electrical Laboratory. Direct Current Generators and Motors, Actual work with machines in the determination of magnetic leakage, iron and copper losses, electrical efficiency, starting torque, magnetization curve and various machine characteristics.

6. Electrical Laboratory. Rotary Converter. A laboratory course which consists of an analysis and a series of tests of a Rotary Converter. Designed to be a connecting link between Direct Current and Alternating Current work; especially adapted to students and engineers who have operated direct current machinery.

4a. Steam Engineering. Power, and measurement of power; testing of scales, steam gauges, and thermometers; sensible, specific, and latent heat; use of steam tables; flow of water; flow of steam; moisture in steam; test of injector. Steam pump; steam boiler—measurements, strength, power, hydraulic test, evaporative test; surface condenser; tests of lubricants, steel, and cement.

5a. Steam Engineering. Engine measurements; slide valve; steam engine indicator; friction load of engine; steam consumption; theoretical cards; test of power plant; test of air compressor and refrigeration plant.

6a. Gas Engine Practice. Combustion of fuels. Internal combustion engines. Four-cycle engine; two-cycle engine. Details of construction of pistons, governors, valves, and throttle-regulators.

7. Alternating Currents. Electrical Instruments and Principles. Covers the theory and actual measurements with instruments to demonstrate the effects of reactance and resistance, the power values of sine waves, the power factor, and the use of vectors. Special attention paid to magnetic circuits in iron and air, and to the design and tests of a reactance coil.

8. Alternating Currents. Transformers and Transmission. A study of the polyphase systems of transmission. Calculations and tests of reactances of cables and overhead lines, and a complete set of tests of potential transformers and constant current transformers.

9. Alternating Current Machinery. Lectures and Electrical Laboratory work on alternating current machinery, embracing a study of and tests of Generators, Induction Motors, Synchronous Motors, Repulsion Motors, and Series Motors.

10, 11, 12. Continuation of 7, 8, 9, respectively.

13. Structural Steel. Composition and Equilibrium of Forces, parallel forces and center of gravity; statics of simple structures. Strength of materials; tension, compression, sheer, and flexure; ties, columns, beams, rivets, and pins.

14. Structural Design. Joints, simple roof truss, plate girder, study of simple bridge, specifications. Truss bridges, dead load, live load, impact and wind stresses, computation of sections.

15. Concrete Construction. Lecture, laboratory, and drafting room work. Composition and properties. Construction and tests of reinforced columns and beams. Specifications and unit strains. Floor construction and design.

Mathematics

1. Arithmetic. Fractions, percentage in its simpler applications, and common measurements.

2. Accounting and Penmanship. Journalizing, accounts, retail, double entry, and the wholesale sets.

3. Elementary Algebra. Fundamental operations, factoring, the solution of equations of the first degree containing one or more unknown quantities, radicals, quadratic equations and equations containing one or more unknown quantities that can be solved by the method of quadratic equations.

4. Plane Geometry, including the solution of simple original exercises and numerical problems. Solid Geometry, including points and lines in space, polyhedrons, cylinders, cones, the sphere, mensuration, exercises and applications.

5. Advanced Algebra. A review of the essentials to be followed by ratio and proportion, and the binomial theorem for positive integral exponents. The progressions, the elementary treatment of permuta-

tions and combinations, and the use of four and five place tables of logarithms.

6. Plane Trigonometry. Functions of angles, trigonometric equations and identities, solution of triangles, applications.

7. Plane Analytic Geometry. Systems of co-ordinates; the equations and properties of the point, straight line, circle, parabola, ellipse, and hyperbola; the use of graphic methods in solving practical problems.

8. Engineering Mathematics. Logarithms, the slide rule, trigonometric functions, the planimeter, steam engine card, horse-power of an engine, efficiency of machines, measurements of temperature, specific heat, heat of combustion, mechanical equivalent of heat, candle-power. power.

9. Engineering Mathematics. Factors, approximations, averages, simple algebraic expressions, substitution and solution, functions of angles, logarithms of numbers, pressure-volume curves, plots, areas, forces, lengths of belts, certain boiler proportions.

10. Engineering Mathematics. Trigonometric problems, oblique triangles, plots, composition and resolution of forces, bursting pressure, kinetic energy, centrifugal force, governor, center of gravity, moment of inertia, strength of springs, power of belting, sections of cone.

Chemistry

1. Practical Chemistry. The first year is designed to give work which will more nearly meet the needs of evening students than does the customary course in general chemistry. With this end in view a course has been outlined which not only gives the fundamental principles of the subject as thoroughly as any elementary course can give them, but in which the laboratory work illustrating these principles is chosen from the operations and manipulations in daily use in the technical laboratory. It is believed that this course will be of immediate benefit to any one who is employed in any industry which involves chemical operations, and that it will serve as the best possible introduction to advanced work in technical chemistry.

2. Qualitative Analysis. The work of the second year is the customary course in qualitative analysis. It consists entirely of individual work in the laboratory and personal consultation with the instructor. The amount of time required for its completion will vary with the previous preparation and the industry and aptitude of the student. The preparation required of those who take this work is the course in practical chemistry or any good course in general chemistry.

3. Quantitative Analysis. As soon as a student has finished this course in qualitative analysis, or its equivalent elsewhere, he may

begin quantitative analysis. This work starts with simple gravimetric and volumetric determinations, which lead up to the more complex determinations and separations required in technical analysis.

Domestic Economy

1. Cookery. Practical work in the preparation of food, with the study of the food elements and the effect of heat upon each. Invalid cookery.

2. Sewing and Millinery. Cutting and making of plain garments, shirtwaists, thin gowns, and dressing jackets. Millinery.

English and History

1. Elementary English: Composition and word study. A course for beginners. Object of the course to help the student in acquiring a vocabulary, and in reading, in spelling, in punctuating, and in writing idiomatic English.

2. Intermediate English. Composition and advanced grammar; rhetoric and the study of English masterpieces. Chief object, to train the student in the use of accurate and idiomatic English. Much attention is given to sentence and paragraph structure, punctuation, and spelling. Two or more themes each week are required.

3. Advanced English. Composition, advanced rhetoric, and English literature. Object, to teach the principles of effectiveness in the use of the language, the application of these principles in theme writing, and a sound appreciation of the best English literature.

4. The English Essay and Shakspere. A rapid survey is attempted of the history of the essay as an exponent of English life and thought. The authors especially studied are Hazlitt, Lamb, Landor, Newman, Carlyle, Emerson, Ruskin, Arnold, Stevenson. Six plays of Shakspere are read and discussed.

5. History. Survey of ancient, medieval, and modern history. American history and social movements.

Latin, German, and Italian

The courses in foreign languages are designed to meet the needs not only of beginners but also of those who wish to do more advanced work.

Book Binding

Adapted to the needs of teachers of the public schools. Exercises for each of the grades are outlined and executed.

Summer Session—1911

July 3 to August 11

Officers of Administration and Instruction

OFFICERS OF ADMINISTRATION

GEORGE NOBLE CARMAN, A. M.
Director

PHILEMON BULKLEY KOHLSAAT, Ph. B.
Dean of Summer School

OFFICERS OF INSTRUCTION

FRED A. ROGERS, B. S.
Professor of Physics

DUANE STUDLEY, B. S.
Assistant Professor of Mathematics

PHILEMON BULKLEY KOHLSAAT, Ph. B.
Assistant Professor of English

DIC HECTOR TROWBRIDGE, B. S.
Assistant Professor of Chemistry

WILLIAM PARKER HAWLEY, B. S.
Assistant Professor of Mechanical Drawing

JUSTIN WYMAN LUDLOW, M. E., C. E.
Asistant Professor in Mechanics

FRED LEWIS TURNER, A. M.
Assistant Professor of Latin

JUDSON FISKE LEE, A. M.
Assistant Professor of History

GEORGE ALEXANDER ROSS
Instructor in Woodwork

CHARLES EDGAR HOYT
Instructor in Foundry Work

ALPHONSO WIRTH CAVANAUGH
Instructor in Mathematics

GEORGE FREDERICK CASSEIL, A. B.
Instructor in German

JULIA GRACE MERRILL
Instructor in Cooking

LOIS MARTIN
Instructor in Sewing and Textiles

GRACE LUCILE HENNECKE
Instructor in Millinery and Sewing

JUDSON THOMAS WEBB
Instructor in Pottery

ADOLPH C. FENSHOLT
Instructor in Physics

EDWIN D. LEMAN
Instructor in Chemistry

PAULINE GLEASON
Instructor in French

CHARLES B. KAZDA
GEORGE R. MOORE
Instructors in Mathematics

JOHN HENRY SMALE, A. B.
M. ELIZABETH SNEED
HARRIET L. ROBERTSON
ROSAMOND M. TOWER
HELEN PIERCE
Instructors in Grade Work

LEE FRANCIS SUPPLE
Assistant in Chemistry

General Information

The Summer work is designed:

1. For the students of the Institute who remain in the city during the summer and who may with profit devote to study a part of the long vacation.

2. For students in other schools who may wish to take advantage of the laboratory and shop equipment of the Institute by pursuing special courses in science and the practical arts.

3. To enable students who have fallen behind in the work of the year to make up deficiencies. Review classes are formed, covering the work of each year of the high school in English, mathematics, history, and foreign languages.

4. For pupils of the sixth, seventh and eighth grades of the public school, classes are formed to do the regular work of these grades.

The tuition for the summer term for a course in one subject five hours a week of class instruction, is five dollars. In laboratory, drawing, shop work, and grade work, ten hours, or a fraction thereof, count as five in determining the tuition.

Mechanic Arts

1. MANUAL TRAINING. Designed for teachers in the primary and grammar grades. Instruction and models suitable for young pupils in constructive work in wood. Special attention given to the application of simple arithmetic and plane geometry in the laying out of problems involved. Students in this course wishing to take drawing in designing of models parallel with shop work may do so. Students are required to furnish drawing instruments and paper.

2. WOOD WORK. A fundamental course preparatory to pattern work and to the arts and crafts.

2a. WOOD WORK. Designed for boys 10 to 14 years old. The use and application of the ordinary bench tools, with instruction suited to each member of the class.

2b. CABINET MAKING. A course in the design and construction of "Arts and Crafts" furniture. Intended for those who have had work equivalent to course 2. It includes the mixing of stains and finishing of hard woods.

7. ELEMENTARY PATTERN MAKING. Intended for students in Engineering and teachers of Manual Training.

8. ADVANCED PATTERN MAKING. Use of general woodworking tools. Stress is laid upon the relation of pattern work to the work of foundry and machine shop.

In connection with the courses outlined above, talks will be given on materials, illustrated by stereopticon, pertaining to the structure of wood, methods of converting trees into lumber, seasoning, characteristics of good timber, defects, methods of preserving lumber, causes of warping, etc., and purposes for which special woods are best adapted.

4. FOUNDRY WORK. The instruction in foundry work is largely individual, the complete equipment of the shop making it possible to give such work as each student desires and needs. One may specialize in cupola and furnace work, in core making, in art bronze and brass work, or in light or heavy machinery molding. Special attention will be given to a course for teachers of manual training.

5. INSTRUMENTAL DRAWING. A course in elementary drawing, dealing with the proper use of the instruments, and teaching standard methods of lettering and conventional methods of representing screws, bolts, nuts, etc. Drawing of simple objects.

6. PROJECTION DRAWING. Explanation and use of the planes of projection, development of sheet metal surfaces, and making of projection drawings from perspective sketches. Tracing on cloth.

10. MACHINE DRAWING. Making of working drawings of machine parts from rough dimensioned sketches, and the simpler forms of design. Tracing.

More advanced machine design will be taught if desired.

20. MACHINE SHOP PRACTICE. A course embodying a study of the construction of the different machine tools with instruction in operating and keeping them in order. Practice in centering, plain, taper, and templet turning, chucking, drilling, boring, external and internal thread cutting; hand tool turning, filing and polishing. Forms of cutting tools, and instruction in grinding. Use of planer, shaper, and universal miller, and grinder; plain milling and cutting of spur and bevel gears

Mathematics

1a. ARITHMETIC. An elementary course in preparation for admission to the Institute.

1. ELEMENTARY ALGEBRA. Problems and equations, positive and negative numbers, addition and subtraction, parentheses, multiplication and division, factoring, highest common factor, lowest common multiple.

2. ELEMENTARY ALGEBRA, four days a week. Simple equations containing fractions, fractions, simple simultaneous equations, involution and evolution. CONCRETE GEOMETRY, one day a week.

3. ELEMENTARY ALGEBRA, four days a week. Theory of exponents, radicals, quadratic equations, simultaneous equations involving quadratics, ratio and proportion. CONCRETE GEOMETRY, one day a week.

4. PLANE GEOMETRY. Preliminary definitions, triangles, parallels, parallelograms, problems, loci of points.

5. PLANE GEOMETRY. Circles, ratio and proportion, similar polygons.

6. PLANE GEOMETRY, completed.

10. ADVANCED ALGEBRA. A review and more thorough study of the fundamental operations. Solution of equations, theory of exponents and surds. Theory of quadratic equations, indeterminate equations of the first degree, inequalities, ratio and proportion, progressions.

12. SOLID GEOMETRY. Points and lines in space, polyhedrons, cylinders, cones, the sphere, mensuration, exercises and applications.

13. COLLEGE ALGEBRA. Permutations and combinations, limits, convergency of series, undetermined coefficients, summation of series, logarithms, introduction to the theory of equations.

14. PLANE TRIGONOMETRY. Functions of angles, trigonometric equations and identities, solution of triangles, applications.

15. Plane Analytic Geometry. Systems of co-ordinates; the equations and properties of the point, straight line, circle, parabola, ellipse, and hyperbola; the use of graphic methods in solving practical problems.

Physics and Engineering

A. General Physics. An elementary course designed to meet the needs of high school students and medical students who have entrance requirements to make up. Recitations and laboratory work.

4. Advanced Physics. An advanced course suitable for teachers and others who wish a college course in physics. As the work is largely individual in character, considerable latitude will be allowed to a student in choosing the particular line of work he wishes to pursue.

5. Electrical Laboratory. The courses in this department will be arranged to suit the individual student.

Chemistry

All courses are designed to meet, as far as possible, the wants of each student.

A. General Chemistry. Academy course.
1. General Chemistry. College course.
4. Qualitative Analysis.
6. Quantitative Analysis. Analysis of foods, etc.
7. Organic Chemistry. General laboratory work.

Domestic Economy

4. Cooking. The aim of the course is to give a knowledge of the composition of foods and of the principles which underlie their preparation for use in the body. Laboratory practice in cooking, and simple experimental work with foods.

A. Sewing. Practice in hand and machine sewing. Talks on materials used. Cutting and making of plain garments. Use of patterns. Two or four hours a day.

B. Sewing. Cutting and making of shirtwaists and wash dresses. Four hours a day.

History

1a. United States History. An elementary course in preparation for admission to the Institute.

1. Grecian History, from the Persian wars to the death of Philip of Macedon.

2. Roman History, from the Punic wars to the death of Cæsar.

3. English History, from the Norman conquest to the present time.

4. United States History. An advanced course with special at-

tention to the sources and formation of the Constitution, its operation, and the history of political parties.

8. The History of Europe since 1815, based upon Robinson and Beard's Development of Modern Europe, Vol. II.

English

A. Reading, Grammar, and Composition. A course in elementary English in preparation for admission to the Institute.

1. Literature and Composition. A review of the required English of the first year.

4. Literature and Composition. A review of the required English of the second year.

7. Literature. The "study-books" required for college entrance in 1911.

9. Literature. The "reading-books" required for college entrance in 1911.

German, Latin, and French

Such elementary classes as may be necessary to meet the demands of the students in attendance.

Pottery

The production of artistic pottery. The instruction will be adapted to the needs of teachers.

Report of the Director for 1910

The Teaching Force

Edward Harman Lay, A. B. (Yale), Instructor in Mathematics, died December 21st, after an illness of one month. Mr. Lay began teaching in the Evening School of the Institute in October, 1900, while he was doing graduate work in the University of Chicago. He became a member of the teaching force of the day session in April, 1901. He was granted leave of absence for the year 1904-5, which he devoted to further study at the University of Chicago. Mr. Lay was a faithful and conscientious teacher.

The following instructors have resigned since January 1st, 1910:

Miss Ethel Percy Andrus, Instructor in English.
Miss Zoura Lane Clark, Instructor in English.
Miss Edna Newton McCallum, Instructor in Latin.
Mr. John Paul Baird, Instructor in Woodwork.

The following promotions have been made since January 1, 1910:

Mr. William Parker Hawley, from Instructor to Assistant Professor in charge of Mechanical Drawing.
Mr. Justin Wyman Ludlow, from Instructor to Assistant Professor of Mechanics.
Mr. Fred Lewis Turner, from Instructor to Assistant Professor of Latin.
Miss Lea Rachel DeLagneau, from Instructor to Assistant Professor of French.
Miss Katherine Isabel Ingersoll, from Instructor to Assistant Professor in charge of Domestic Arts.
Miss Minna Caroline Denton, from Instructor to Assistant Professor of Physiology and Bacteriology.
Miss Mabel Thacher Wellman, from Instructor to Assistant Professor in charge of Domestic Science.
Mr. Judson Fiske Lee, from Instructor to Assistant Professor of History and Economics.
Mr. Frank Harrison Wade, from Assistant to Instructor in Physics.
Mr. Edwin D. Leman, from Assistant to Instructor in Chemistry.
Mr. Adolph C. Fensholt, from Assistant to Instructor in Physics.
Miss Laura M. Winkleman, from Assistant to Instructor in Cooking and Sewing.
Miss Portia Carnes, from Assistant to Instructor in English and Dramatics.

The following appointments have been made since January 1, 1910:

Miss Grace Emerson Moore, Instructor in Domestic Economy.
Mr. Jacob M. Kinney (A. M., University of Nebraska, 1907), Instructor in Mathematics.
Miss Helen F. Page, Instructor in English.
Mr. John Henry Smale (A. B., University of Chicago, 1904), Instructor in English.
Mr. Charles J. Clark, Instructor in Foundry.
Miss Ada Estelle Campbell (Associate in Arts, Lewis Institute, 1909), Instructor in Latin and History.
Miss Ethel J. Pond, Instructor in Sewing.
Miss Sarah Edith Cole, Instructor in Sewing.
Mr. George R. Moore, Assistant in Mathematics.
Mr. Charles B. Kazda, Assistant in Mathematics.

The Degree of Bachelor of Science in Domestic Economy

From the opening of the Institute, the demand for teachers in domestic economy has been so pronounced that provision was made at the outset for the training of teachers in the household arts. For several years the instruction was confined for the most part to the practical arts of cooking and sewing with so much of science and design as could be compassed in a single school year. Five years ago the course was extended to two years, and the title of Associate in Domestic Economy was granted to those who met the requirements. The number of young women who come to the Institute to prepare for teaching domestic economy has increased so steadily that it has become necessary, from time to time, to add to the teaching force and to provide more room and additional equipment for the use of the department. The necessity for lengthening the course from two to four years and for granting the degree of Bachelor of Science has become more and more apparent. The bachelor's degree has come to be a prerequisite for candidates for positions as teachers in high schools. In Chicago those only who have had three years of practical training are eligible to take the examination for high school teachers of domestic economy. It has therefore been decided to grant the degree of Bachelor of Science in Domestic Economy. The title of Associate will be given as heretofore. The requirements for the degree and the title are set forth in this Bulletin on pages 14 and 16.

The Co-operative Course for Shop Apprentices

Twenty of the forty-seven boys who began in shop and school in January, 1909, completed the two years' work as shown in the following table, which also indicates where the apprentices were employed, the number who started, and whether recommended by the shop or the Institute. Similar facts with reference to those now in the Institute are shown in the same table.

NAMES OF SHOPS CO-OPERATING	CLASS OF 1909				CLASSES OF 1910–11				
		Recommended				Recommended			
	No. Starting	By Shop	By Institute	No. Finishing	No. Starting	By Shop	By Institute	No. Attending	Total Number Enrolled
Acme Steel Goods Co.	3	1	2	1	....	....	....	....	3
Aermotor Company	5	3	2	3	10	2	8	4	15
Allis-Chalmers Co.	6	0	6	2	1	0	1	0	7
Caldwell & Sons Co.	2	0	2	0	....	....	....	....	2
Goldman & Co., E.	2	0	2	0	2	0	2	2	4
Goodman Mfg. Co.	3	3	0	2	3	1	2	3	6
Gregory Electric Co.	....	....	....	....	4	0	4	0	4
Hanna Engr. Works	2	2	0	2	2	0	2	0	4
Latham Machinery Co.	2	0	2	2	2	0	2	2	4
Link-Belt Mchry. Co.	4	0	4	1	5	1	4	3	9
Miehle Printing Press Co.	....	....	....	....	5	2	3	3	5
Pelouze Electric Co.	....	....	....	....	5	0	5	4	5
Roth Bros. & Company	....	....	....	....	5	0	5	2	5
Sullivan Machinery Co.	2	2	0	2	4	2	2	3	6
Temple Pump Co.	2	0	2	0	....	....	....	....	2
Thordarson Elec. Mfg. Co.	....	....	....	....	3	0	3	3	3
Union Special Mchry. Co.	7	1	6	2	7	2	5	4	14
Weller Mfg. Company	3	0	3	1	1	0	1	0	4
Wilson & Co., F. C.	2	0	2	0	....	....	....	....	2
Wolf Co., Fred.	....	....	....	....	2	0	2	2	2
Woods Motor Vehicle Co.	2	2	0	2	3	1	2	2	5
Lewis Institute	....	....	....	....	1	0	1	1	1
TOTAL	47	14	33	20	65	11	54	38	112

Summary of Attendance, 1909-10

Students in Day Classes				1439
College Students			306	
Engineering Students (Men)		102		
Science and Arts Students		156		
Men	26			
Women	130			
Unclassified Students		48		
Men	21			
Women	27			
Academy Students			821	
Classified		692		
Boys	480			
Girls	212			
Unclassified		129		
Boys	81			
Girls	48			
Summer Students			395	
Boys	226			
Girls	169			
Total Day Students			1522	
Deduct Students counted twice			83	
Students in Evening Classes				1697
Engineering Students (Men)			501	
Mechanic Arts			428	
Men		422		
Women		6		
Mathematics			262	
Men		248		
Women		14		
English			193	
Men		128		
Women		65		
Domestic Economy			282	
Cooking (Women)		174		
Sewing (Women)		108		
Chemistry			63	
Men		57		
Women		6		
Latin			8	
Men		5		
Women		3		
German			11	
Men		9		
Women		2		
Pottery			38	
Men		6		
Women		32		
Physical Culture (Women)			53	
Total Evening Students			1839	
Deduct Students Counted Twice			142	
Total Day and Evening Students				3136

Summary of Treasurer's Report

The following statement summarized from the Treasurer's report shows the value of the property of the Institute and the income and expenditures for the year ending June 30, 1910. Most of the excess of the income over expenditures is used for equipment:

VALUE OF PROPERTY

Institute buildings	$404,336.11	
Institute ground	118,280.00	
Institute equipment	202,605.81	
Total		$ 725,221.92
Real estate	$679,157.58	
Bonds	167,000.00	
Stocks	4,500.00	
Mortgage loans	278,150.00	
Cash	4,727.04	
Other resources	8,255.47	
Total		1,141,790.09
Value of all properties		$1,867,012.01

INCOME FOR YEAR ENDING JUNE 30, 1910.

Day school tuition	$63,391.37	
Evening school tuition	18,945.00	
Summer school tuition	4,213.30	
Total		$ 86,549.67
Net revenue from real estate	$49,964.84	
Interest on bonds	8,019.12	
Stock dividends	320.00	
Interest on mortgage loans	16,258.20	
Other income	1,576.16	
Total		76,138.32
Income from all sources		$162,687.99

EXPENDITURES FOR YEAR ENDING JUNE 30, 1910

Instruction and school administration	$105,679.03	
Engineers and janitors	13,037.31	
Shop and laboratory supplies	6,780.43	
Fuel and other supplies	13,986.43	
Repairs and alterations	1,430.65	
Student service	5,047.59	
Total		$145,961.44
Business management	$ 3,542.04	
Repairs	1,853.41	
Other expenses	434.92	
Total		5,830.37
Total expenditures		$151,791.81
Excess of income over expenditure		10,896.18

UNIVERSITY OF ILLINOIS

PRESIDENT'S OFFICE

3 0112 106201509